Propeller Owner/Operator Information Manual

Click on a link below to select a section of the information manual.

Welcome

Introduction

List of Revisions

Fixed Pitch Series Propellers

C200, C300, C400, and C500 Model Series Propellers

C600, C650, and C1100 Model Series Propellers

C700, C750, and C1000 Model Series Propellers

Propeller Logbook

WELCOME

1. Thank you for purchasing a McCauley propeller.

A. The manual on this CD provides you with information that is important for the continued airworthiness of your propeller.
   (1) This CD manual is designed to provide you with quick access to the information you desire. It provides you links that can be selected to carry you through the information pertaining to your model series of propeller. Please take a few minutes to familiarize yourself with this CD.

2. Use the CD Contents Most Effectively

A. Display the bookmark pane on the manual PDF.
   (1) You will see several model series bookmarks, each of which can be expanded or minimized. If you expand the bookmark that applies to your propeller, you will see many named bookmarks that will link you directly to the applicable text as it refers to your propeller series.
   (2) Click with your mouse on the topic named in the bookmark pane to display the desired text or illustration.

3. Model Designations

A. The following can be used to determine your constant speed propeller model series:
   - Two blade constant speed: -- 200 series (Models 201 - 299)
   - Two blade constant speed and feathering: -- 300 series (Models 301 - 399)
   - Three blade constant speed: -- 400 series (Models 401 - 499)
   - Three blade constant speed and feathering: -- 500 series (Models 501 - 599)
   - Three blade constant speed, feathering and reversing for Allied Signal/Garrett (Honeywell) engines: -- 600 series (Models 601 - 649)
   - Four blade constant speed, feathering and reversing for Allied Signal/Garrett (Honeywell) engines: -- 650 series (Models 651 - 699)
   - Three blade constant speed, feathering and reversing for Pratt & Whitney engines: -- 700 series (Models 701 - 749)
   - Four blade constant speed, feathering and reversing for Pratt & Whitney engines: -- 750 series (Models 751 - 799)
   - Five blade constant speed, feathering and reversing for Pratt & Whitney engines: -- 1000 series (Models 1001 - 1049)
   - Five blade constant speed, feathering and reversing for Allied Signal/Garrett (Honeywell) engines: -- 1100 series (Models 1101 - 1149, excluding Models 1101 through 1104)

B. Fixed pitch propellers:
   - For the purposes of this manual, all McCauley fixed pitch metal propellers are the same model series.

4. Additional Resources

A. In addition to the information we included in this manual, the FAA has issued the following Advisory Circulars (AC) that may aid you in continued airworthiness of your propeller:

   NOTE: (X) signifies latest revision level.

   - AC20-37(X) Aircraft Metal Propeller Maintenance
   - AC35.4-1 Propeller Instructions for Continued Airworthiness
   - AC43-9(X) Maintenance Records

B. If you have any questions about your propeller, please contact your closest McCauley Service Center or McCauley Product Support.
   (1) Current contact information can be found at www.mccauley.textron.com 24 hours a day, or by calling 316-831-4021 between 8:00 AM and 4:30 PM Central Time.
   Thank you for letting McCauley fulfill your airplane propeller needs.
   McCauley Propeller Systems

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INTRODUCTION

1. General

A. This Owner/Operator Manual provides familiarization and line maintenance instructions for McCauley propellers.

B. All maintenance and service procedures described and authorized in this manual must be done only by qualified personnel.

C. Overhaul or any repair procedure that involves the internal components of the propeller must be done only by an authorized and qualified propeller overhaul facility in accordance with the appropriate McCauley propeller overhaul manual.

2. Additional Reference Manuals

A. The following publications contain additional maintenance and service information about McCauley propellers. Each of the referenced publications has a specific application to the owners and operators of aircraft with McCauley propellers installed.

(1) McCauley overhaul manuals. These manuals provide maintenance and overhaul information and illustrated parts lists.

NOTE: Overhaul manuals may be used only by approved propeller repair stations.

(2) Blade Overhaul Manual and Standard Practices Manual. These manuals include information to supplement the overhaul manual and provide information about procedures common to various propeller models. The Blade Overhaul Manual includes minimum allowable thickness and width tables for blades.

NOTE: Blade Overhaul Manual and Standard Practices Manual may be used only by approved propeller repair stations.

(3) McCauley Application Guide (MAG). This Guide has a compilation of information published in the FAA/CAA aircraft type data sheets regarding propeller, spinner and governor installations on various aircraft.

NOTE: This guide is not FAA approved, and is for reference only. Refer to the appropriate Type Certificate Data Sheet (TCDS) or Supplemental Type Certificate (STC) to verify information contained in this guide.

(4) McCauley Service Bulletins. These are issued to advise of design changes that must be incorporated, to provide procedures for correcting problems that have been found, and to provide other important service and overhaul information.

(5) McCauley Service Letters. These are issued to provide information such as warranty replacement policies, parts availability information, minor modifications and other supplemental information.

(6) FAA Advisory Circular 43.13-1[X]. This publication provides general acceptable maintenance procedures for propellers.

(7) FAA Advisory Circular 20-37[X]. This publication provides general acceptable maintenance and inspection procedures for propellers.

(8) 14 CFR Part 43 Appendix A. This appendix defines the differences between minor and major propeller repairs. Major repairs may only be performed by an approved propeller repair station.

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LIST OF REVISIONS

1. General

A. This manual, MPC-26, includes the original issue and the revisions listed in Table 1. To ensure information in this manual is current and the latest maintenance and inspections procedures are available, the revisions must be incorporated in the manual as they are issued.

Table 1. Original Issue -- April 7, 2008

Revision Number	Date	Revision Number	Date
1	Dec 7, 2009		

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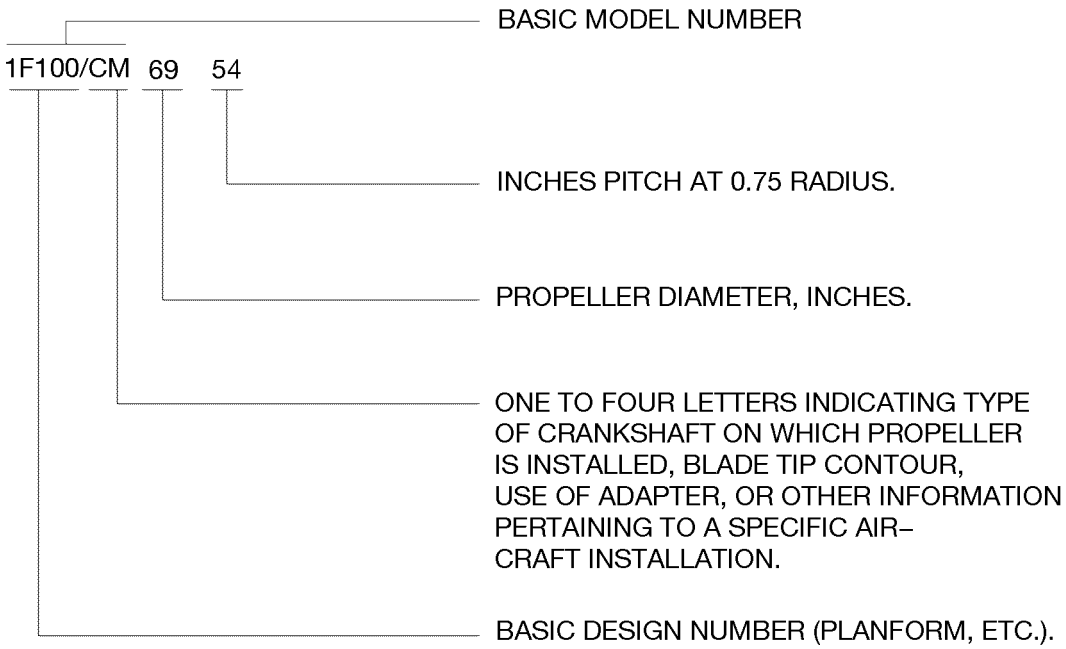
FIXED PITCH PROPELLER DESCRIPTION

1. Metal Fixed Pitch Propellers

A. The propellers of this model series are manufactured of one-piece anodized aluminum alloy and have a fixed pitch.

B. For identification, the hub of each propeller is stamped with the complete model number, serial number, Federal Aviation Agency (FAA) type certificate number, production certification number, and the number of times the propeller has been reconditioned. The complete model number is a combination of the basic model number and suffix numbers to indicate the propeller diameter and pitch.
(1) Propeller Model Designation
(a) The hub model designation is steel stamped on the cylinder face of the propeller hub.
1 Example of hub model designation:

C1390


BASIC MODEL NUMBER
1F100/CM 69 54
INCHES PITCH AT 0.75 RADIUS.
PROPELLER DIAMETER, INCHES.
ONE TO FOUR LETTERS INDICATING TYPE OF CRANKSHAFT ON WHICH PROPELLER IS INSTALLED, BLADE TIP CONTOUR, USE OF ADAPTER, OR OTHER INFORMATION PERTAINING TO A SPECIFIC AIR–CRAFT INSTALLATION.
BASIC DESIGN NUMBER (PLANFORM, ETC.).

C. Consult the FAA TC Data Sheets for details relating to approved engine/propeller/airplane installations of fixed pitch propellers covered in this manual.

D. Propeller Time Between Overhaul (TBO) and Life Limited Parts
(1) Refer to the latest revision of McCauley Service Bulletin SB137(XX), Revised Time Between Overhaul (TBO) Specifications for required propeller overhaul intervals and life limited parts.

E. Propeller Mounting Torque
(1) Refer to the latest revision of McCauley Service Bulletin SB227(X), Propeller Installation Mounting Torque for the correct installation instructions and torque values for propeller mounting hardware.

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F. Propeller Strike or Sudden Engine Stoppage
   (1) Refer to the latest revision of McCauley Service Bulletin SB176(X), Necessary Actions Following Object Strike of Stationary Propeller, Blade Strike of Rotating Propeller, Bird Strike, or Sudden Engine Stoppage for the current inspection requirements following a propeller "strike" type event.

G. Lightening Strike
   (1) Refer to the latest revision of McCauley Service Bulletin SB177(X), Lightening Strike Inspection Requirements for the current inspection requirements following a suspected propeller lightening strike type event.

H. Definitions of Propeller servicing:
   (1) Overhaul. This term denotes a complete tear-down and reassembly which is not necessarily applicable to a fixed pitch propeller. The terms "overhaul" and "reconditioning" are synonymous for a fixed pitch propeller.
   (2) Reconditioning. The repair of minor or major blade damage caused by erosion or striking small objects during normal operation. The propeller shall be penetrant inspected, refinished, and rebalanced. Reconditioning is accomplished on an irregular basis as necessary and required.
   (3) Repair. The correction on an irregular basis as necessary, of minor or major damage that has occurred to the propeller. The amount, degree, and extent of damage determines whether or not the propeller can be repaired without refinishing. If a propeller is bent or twisted, the repair is major and reconditioning must be accomplished.
   (4) Frequency of Overhaul. Refer to the latest revision of McCauley Service Bulletin SB137(XX), Revised Time Between Overhaul (TBO) Specifications for required propeller overhaul intervals. Propellers shall also be overhauled or repaired as required for blade surface conditions. The propeller mounting bolt torque should be checked at least once a year. Propeller mounting bolts should be penetrant inspected whenever the propeller is removed from the engine.

2. Blade Serial Number Stamping Information

A. Blade serial number information is stamped on the hub. (Refer to Figure 1).

Table 1. Blade Year of Manufacture Code

A = 1980	L = 1991	W = 2002	AH = 2013	AS = 2024
B = 1981	M = 1992	X = 2003	AI = 2014	AT = 2025
C = 1982	N = 1993	Y = 2004	AJ = 2015	AU = 2026
D = 1983	O = 1994	Z = 2005	AK = 2016	AV = 2027
E = 1984	P = 1995	AA = 2006	AL = 2017	AW = 2028
F = 1985	Q = 1996	AB = 2007	AM = 2018	AX = 2029
G = 1986	R = 1997	AC = 2008	AN = 2019	AY = 2030
H = 1987	S = 1998	AD = 2009	AO = 2020	AZ = 2031
I = 1988	T = 1999	AE = 2010	AP = 2021	
J = 1989	U = 2000	AF = 2011	AQ = 2022	
K = 1990	V = 2001	AG = 2012	AR = 2023	

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Table 2. Blade Month of Manufacture Code

A = January	E = May	I = September
B = February	F = June	J = October
C = March	G = July	K = November
D = April	H = August	L = December

(1) Blade serial numbers assigned after 1980 and before June 15, 2000:
   (a) The first letter represents the year of manufacture.
   (b) The second letter represents the month of manufacture.
   (c) The following digits represent the number of the blade manufactured during the month of manufacture.

(2) Blade serial numbers assigned after June 15, 2000:
   (a) The first or first and second letters represent the year of manufacture.
   (b) The second, or third, letters represent the month of manufacture.
   (c) The first two digits represent a reference forging model.
   (d) The following digits represent the number of the blade manufactured during the month of manufacture.

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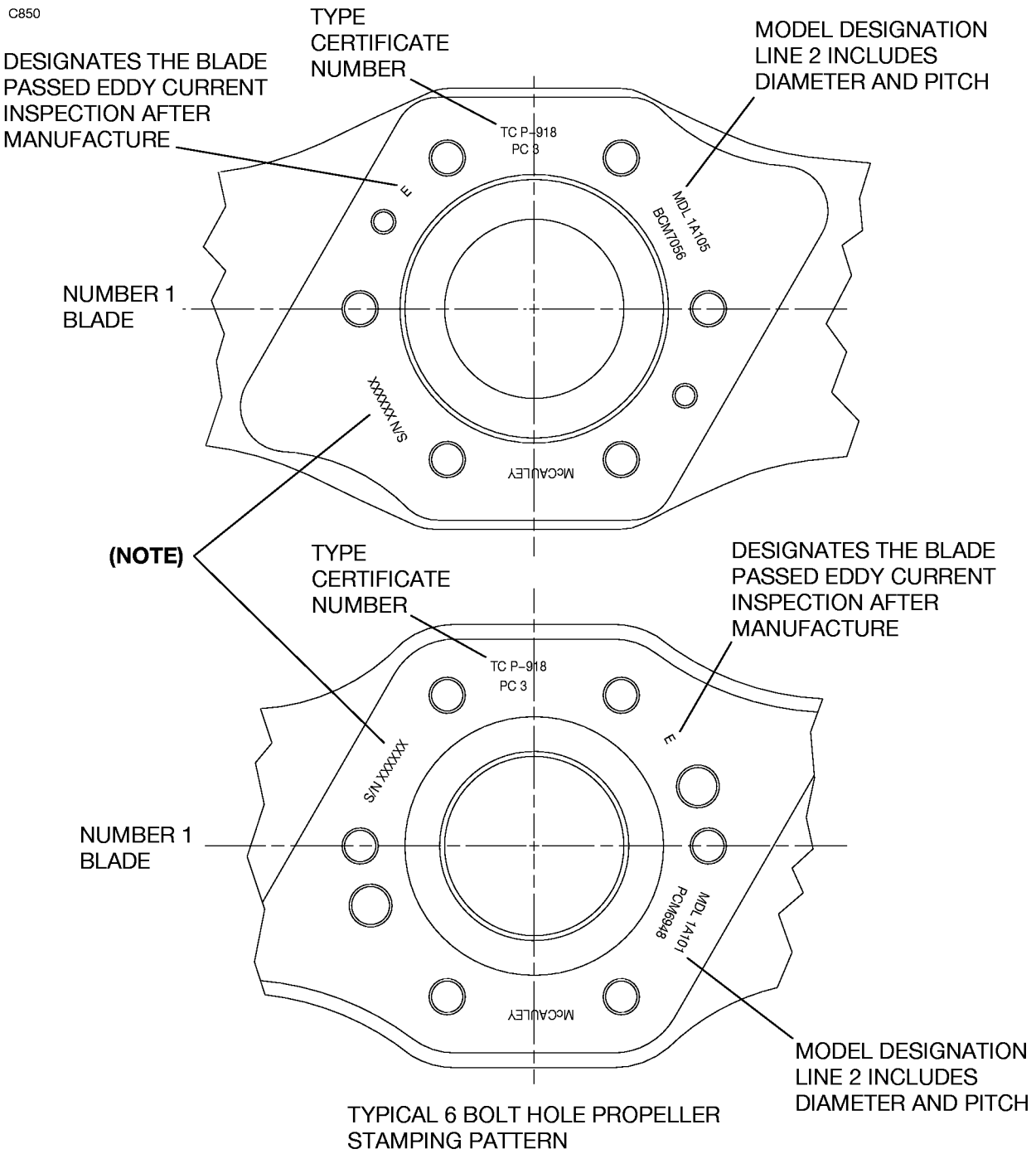

TYPICAL 6 BOLT HOLE PROPELLER STAMPING PATTERN

NOTE: STAMPING ARRANGEMENT OR LOCATION OF THE SERIAL NUMBER IS OPTIONAL. LETTERING MAY BE ARCHED OR STRAIGHT, BUT THE SERIAL NUMBER STAMPING IS FOUND AT THE NUMBER 1 BLADE.

0101T1151

Fixed Pitch Blade Stamping
Figure 1 (Sheet 1)

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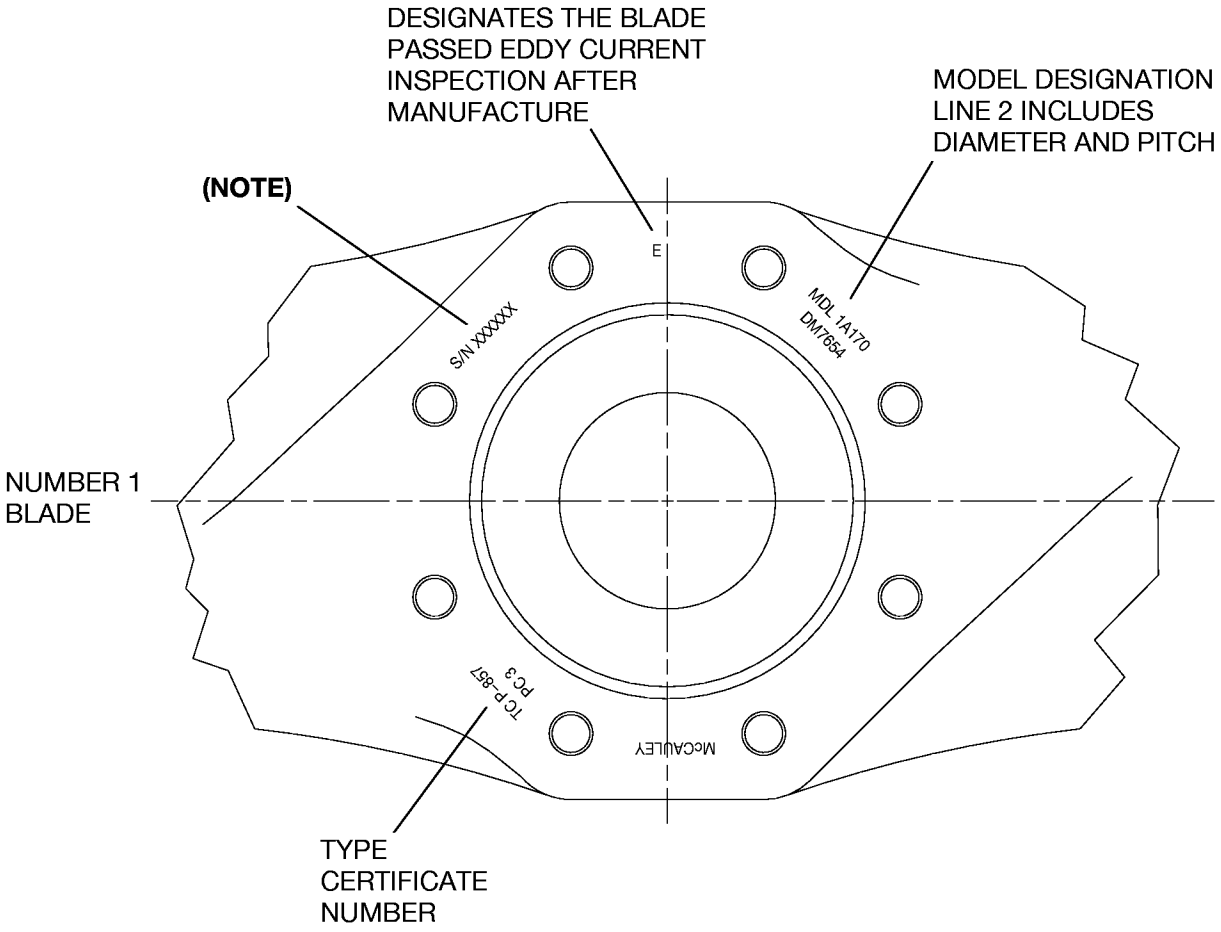
C851



TYPICAL 8 BOLT HOLE PROPELLER
STAMPING PATTERN

NOTE: STAMPING ARRANGEMENT OR LOCATION OF THE SERIAL NUMBER IS OPTIONAL. LETTERING MAY BE ARCHED OR STRAIGHT, BUT THE SERIAL NUMBER STAMPING IS FOUND AT THE NUMBER 1 BLADE.

0101T1152

Fixed Pitch Blade Stamping
Figure 1 (Sheet 2)

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CONSTANT SPEED PROPELLER SYSTEM DESCRIPTION and OPERATING PRINCIPLES

1. Reciprocating (Piston) Engine Propellers

A. McCauley propellers for reciprocating engines are of two types: constant speed or constant speed feathering. Each type is provided in either a two-blade or three-blade configuration.
   (1) The C200 Series is a two-blade constant speed propeller. (Refer to Figure 1).
   (2) The C300 Series is a two-blade constant speed feathering propeller. (Refer to Figure 2).
   (3) The C400 Series is a three-blade constant speed propeller. (Refer to Figure 3).
   (4) The C500 Series is a three-blade constant speed feathering propeller. (Refer to Figure 4).

B. Each propeller consists of a hub assembly, propeller blades, piston and cylinder assembly.

C. Description of the Propeller Assembly and Deice Components:
   (1) Propeller Hub Assembly - The propeller hub is a single piece, hollow assembly with propeller blade sockets. Each blade socket to blade shank is O-ring sealed to prevent leakage. The rear hub face has threaded studs or bolts for attachment to the engine flange. Some engine flanges have dowels that mate with holes in the hub for alignment. These ensure proper mounting to the engine propeller shaft flange.
   (2) Propeller Blades - The propeller blades are made of solid forged aluminum. Each is match-balanced to the other blades.
      (a) The entire propeller assembly is static balanced as well, using balance weights mounted with screws to the blades or the cylinder balance ring.
   (3) Blade Retention - A set of split retainers (inside the hub) secures each blade in the hub at the blade sockets. During pitch change, each blade rotates about its axis on a bearing assembly. An actuating pin assembly is secured to the blade butt of each blade (inside the hub) by screws. The actuating pin is driven by a link assembly attached to the piston yoke inside the hub cavity.
   (4) Piston and Cylinder Assembly - Oil pressure, controlled by the propeller governor, and an internal spring act on the piston to provide the forces necessary to accomplish propeller blade pitch changes. The cylinder is mounted to the hub face with screws and is sealed to prevent leakage.
   (5) Counterweight - Feathering type propellers have counterweights attached to the blades to assist the rotation of the blade to the feathered position.
   (6) Internal Lubrication - On some models, grease is applied to the bearings for lubrication when the propeller is assembled. However, on other models the lubrication medium is oil. On oil-filled propellers, the hub cavity is partially filled with red dyed engine type oil which is sealed in the hub and isolated from engine oil. This oil provides lubrication and corrosion protection to blade bearings and other internal parts. The oil is dyed red to aid in the troubleshooting of suspected propeller leaks.

      NOTE: Periodic field maintenance of this lubrication is NOT normally required.

D. Description of Piston Engine Propeller Operating Principles
   (1) The C200 and C400 series propellers are constant speed type. They are a single-acting unit in which hydraulic pressure works against the forces of springs and the natural centrifugal moment of the rotating blade to provide the correct pitch for engine load. Hydraulic pressure causes the blades to move toward high pitch (decreasing rpm). The springs and centrifugal moments urge blades toward low pitch (increasing rpm).
   (2) The C300 and C500 series propellers are constant speed and full-feathering type. They are a single-acting unit in which hydraulic pressure works against the forces of springs and counterweights to provide the correct pitch for engine load. Hydraulic pressure causes the blades to move toward low pitch (increasing rpm). The springs and counterweights urge blades toward high pitch (decreasing rpm).

E. Propeller Deice (Refer to Figure 11)

   NOTE: Only components sold by McCauley are described. Some OEMs or STC owners may have different designs.

   (1) If propeller deice is installed, the components include:
      • electrically heated rubber boots

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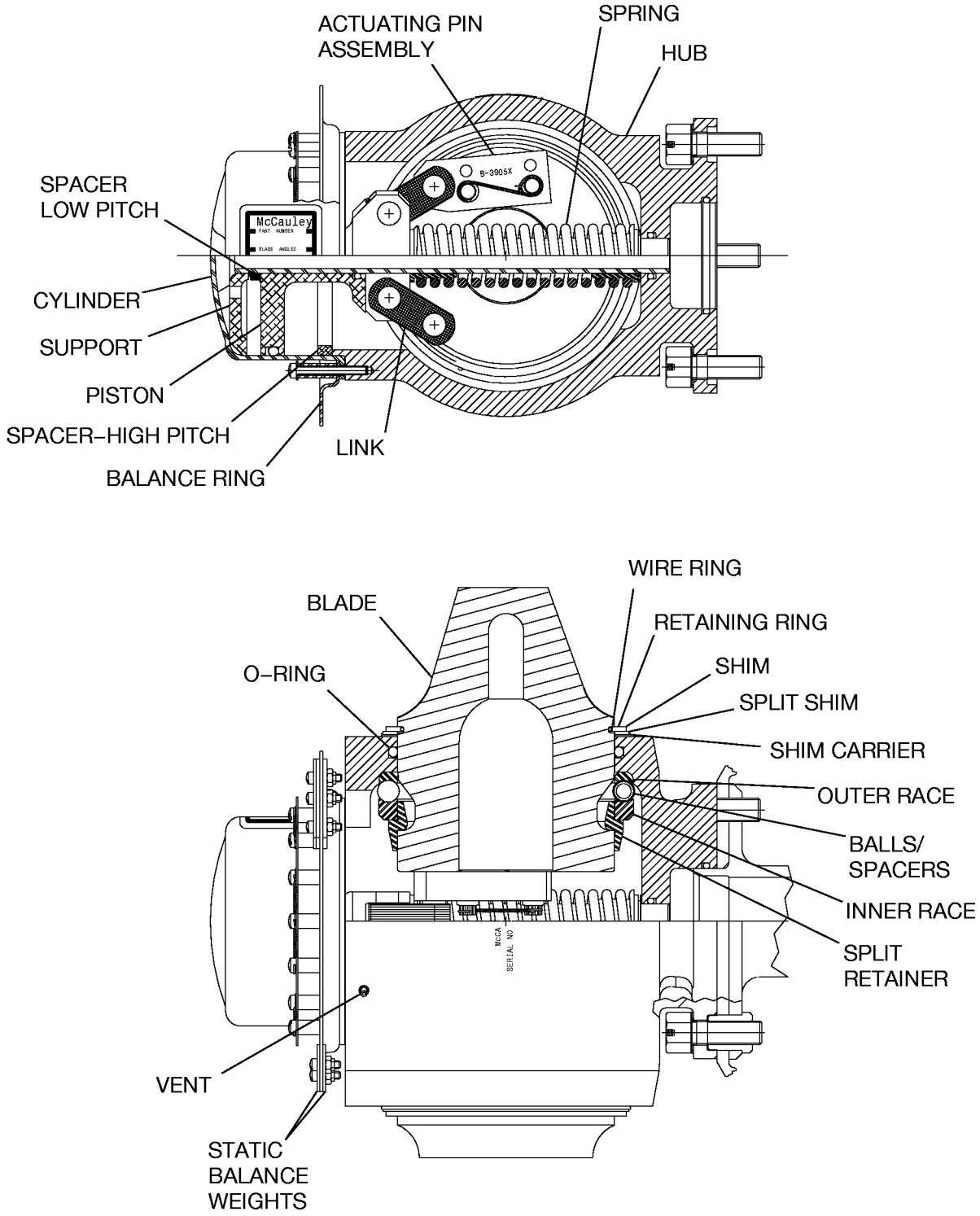
C320



NON OIL FILLED

0102T1004

C200 Series Propeller
Figure 1 (Sheet 1)

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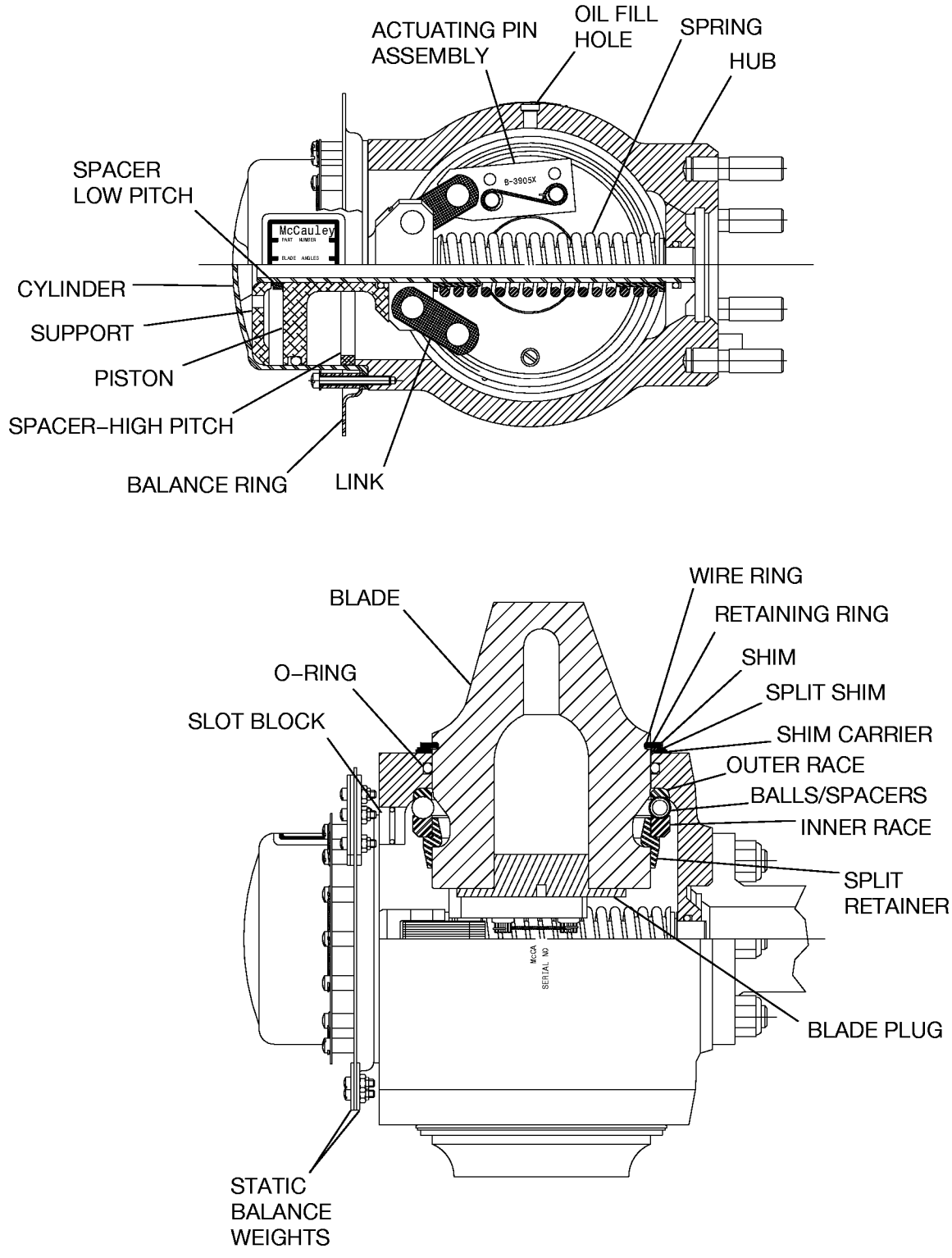
C336



OIL FILLED

C200 Series Propeller
Figure 1 (Sheet 2)

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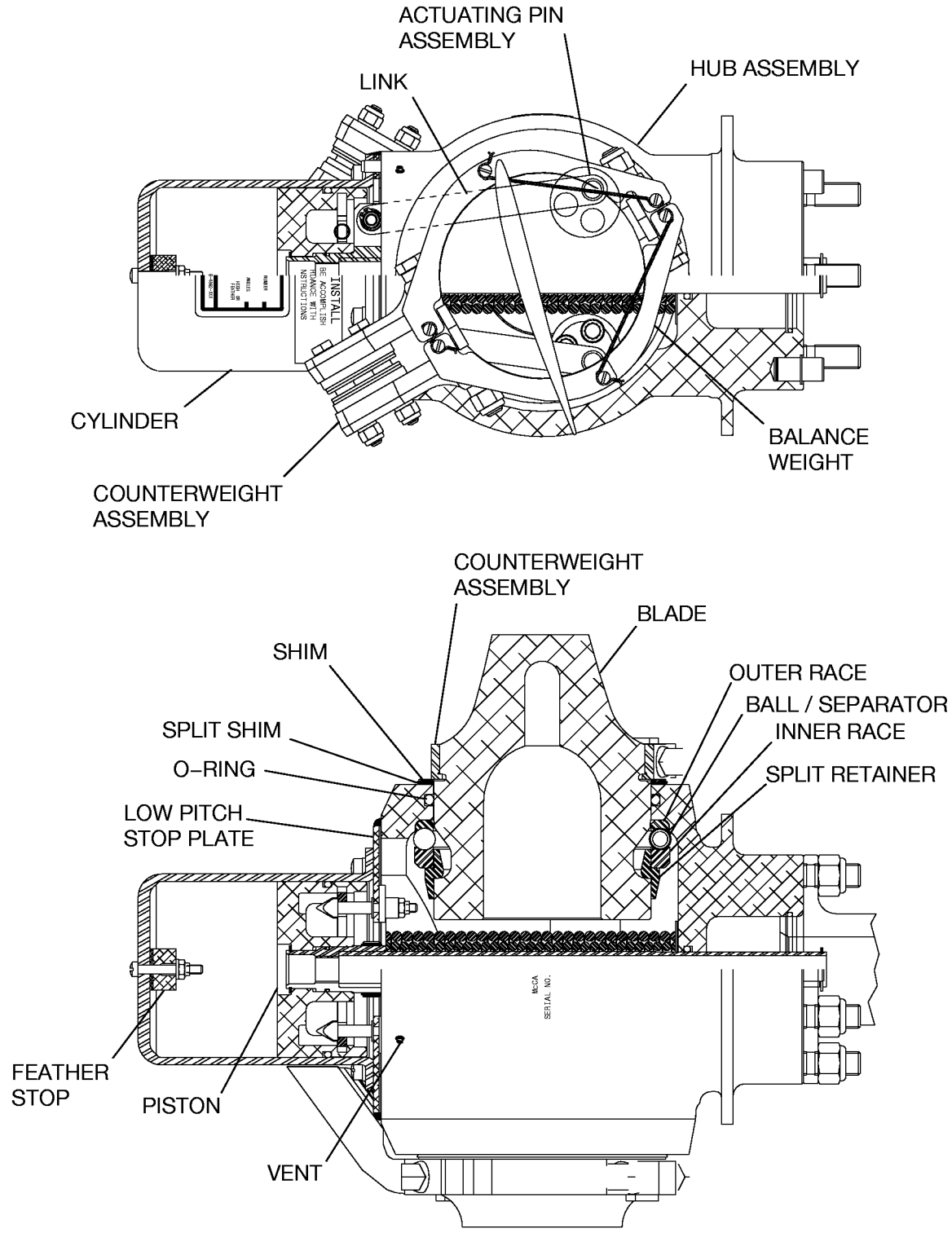
C319



C300 Series Propeller (Non Oil-Filled)
Figure 2 (Sheet 1)

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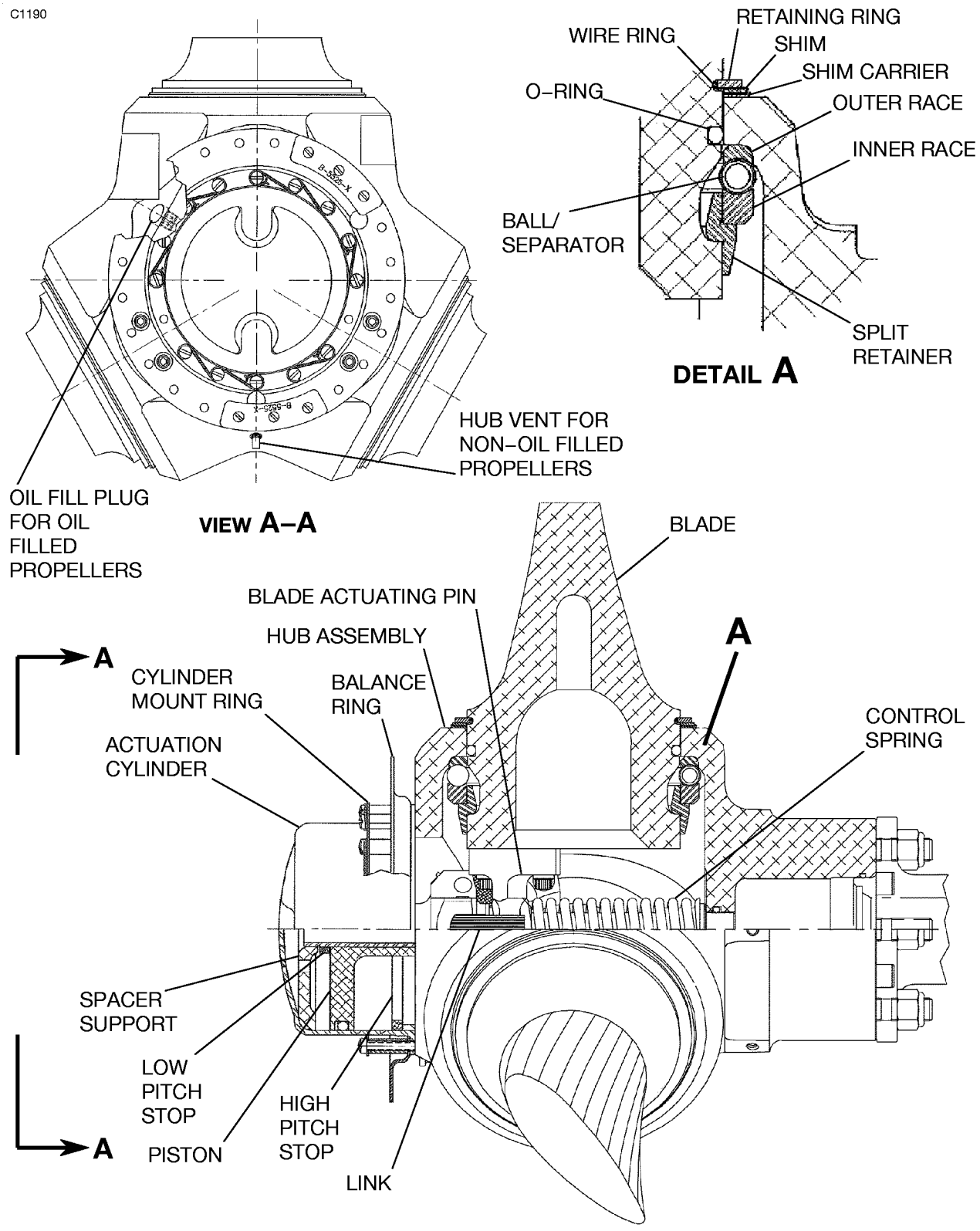

C400 Series Propeller
Figure 3 (Sheet 1)

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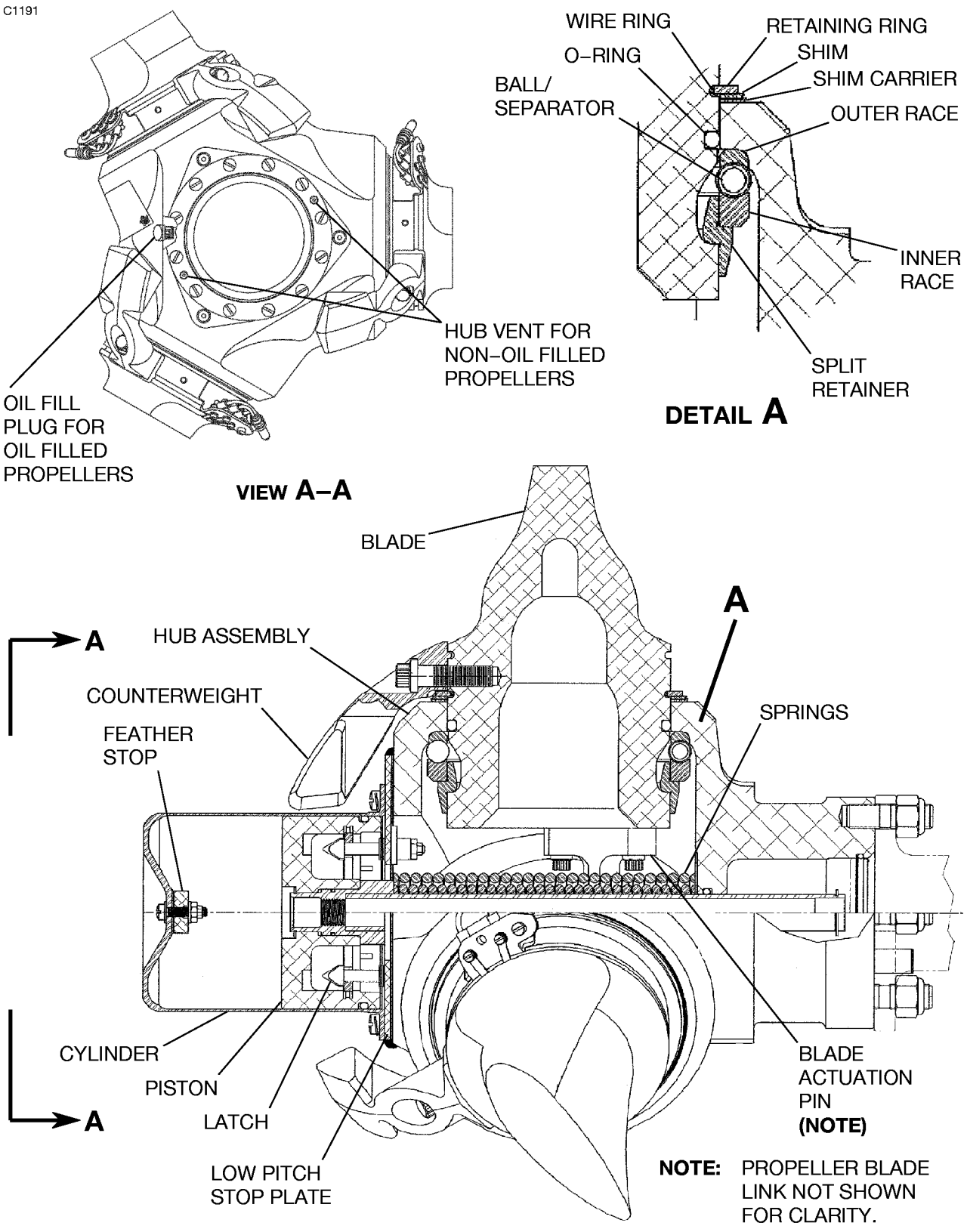

C500 Series Propeller
Figure 4 (Sheet 1)

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- deice harnesses
- slip ring assembly
- deice timer
- brush block assembly

(a) The brush block, deice harnesses, and slip ring assembly conduct electrical power to the propeller blade deice boot elements which then heat.

(b) The heat melts a layer of the ice which allows the remaining ice to be removed from the propeller blades by centrifugal force.

F. Propeller Anti-Ice (Refer to Figure 11)

(1) If propeller alcohol anti-ice is installed, the components include:

- slinger ring assembly
- spray head assembly
- propeller blade feed shoe

(a) The slinger ring distributes anti-ice fluid from the fluid reservoir to the spray head assembly for each propeller blade. Anti-ice fluid is pumped into the rotating slinger ring and the centrifugal force of the rotating slinger ring forces the anti-ice fluid to flow to the spray head assemblies.

(b) The spray head assembly transports the anti-ice fluid from the slinger ring to the propeller blade feed shoe. The spray head distributes the ant-ice fluid across the grooves that are imbedded in the propeller blade feed shoes.

(c) The propeller blade feed shoe is attached to the leading edge of each propeller blade. The feed shoes are made of rubber and have groves to guide/feed anti-ice fluid (alcohol) along the leading edge of the rotating propeller by centrifugal force. The alcohol that is distributed on the feed shoe and adjacent blade surface prevents the formation of ice on the propeller blades.

G. Propeller Deice Boots/Alcohol Anti-Ice Feed Shoes (if installed).

(1) The deice boots are constructed of fabric-reinforced, abrasion-resistant rubber. Electrical deice boots have a wire mesh or foil element that heats as current is supplied to the boot. A deice timer controls the current cycle that is applied to individual blades or boot segments. Alcohol anti-ice feed shoes are ridged for distribution of alcohol. The outer surface that is exposed to the environment has a glossy finish, while the side that is bonded to the propeller has a dull, matte finish.

H. Deice Harness (if deice is installed) - The deice electrical harnesses connect the deice boots to the slip ring assembly to complete the deice electrical circuit.

I. Deice Slip Ring Assembly (if deice is installed) - The deice slip ring assembly is constructed of machined aluminum with bronze commutator rings bonded to one side. Studs to attach the deice leads for each blade are located on the propeller side of the platter. These are brazed to the commutator rings and pass through holes provided for that purpose. Slip ring assemblies may be secured to the hub, to the starter ring gear, or the alternator belt drive pulley.

2. Turbine Engine Propellers

A. Turbine Engine Propeller Component Description

(1) The McCauley C600 is a three blade propeller, the C650 is a four blade propeller, the C1100 is a five blade propeller. Each consists of a hub assembly, propeller blades, piston and cylinder assembly, blade start locks, counterweights, a spinner, and spinner bulkhead assembly. (Refer to Figure 5, Figure 6 and Figure 10.)

(a) The McCauley C600, C650, and C1100 propellers are used on Honeywell (Garrett) turbine engines.

NOTE: This manual does not include information for C1101 through C1104 propellers.

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(2) The McCauley C700 is a three blade propeller, the C750 is a four blade propeller, the C1000 is a five blade propeller. Each consists of a hub assembly, propeller blades, piston and cylinder assembly, counterweights and beta shift mechanisms. (Refer to Figure 7, Figure 8 and Figure 9.)

(a) The McCauley C700, C750 and C1000 propellers are used on Pratt and Whitney turbine engines.

(3) Following is a breakdown of each of the propeller assemblies:

(a) Propeller Hub Assembly

1 The propeller hub is a single-piece hollow assembly incorporating three, four or five propeller blade sockets. The propeller blade sockets are O-ring sealed to prevent leakage. The rear hub face has threaded studs and dowel holes for alignment and proper mounting to the engine propeller shaft flange. The cylinder is mounted to the hub face using screws and is O-ring sealed to prevent leakage.

(b) Propeller Blades

1 The propeller blades are made of solid forged aluminum. A set of split retainers (inside the hub) secures each blade in the hub at the propeller blade sockets. Each blade rotates about its axis on a bearing assembly during pitch change and is match-balanced to the other blades. The propeller assembly is static balanced, using balance weights mounted with screws to the blades.

(c) Piston and Cylinder Assembly

1 The piston and cylinder assembly (through the feather springs, counterweights, and oil pressure transferred through the piston rod) provide the forces necessary to accomplish propeller blade pitch changes.

(d) Counterweights

1 Counterweights are attached to the blades to assist the feathering spring (located in front of the piston and cylinder assembly) in feathering the propeller blades by means of centrifugal force whenever the propeller is rotating and oil pressure in the cylinder is removed.

(e) Internal Lubrication

1 The propeller hub cavity is partially filled with turbine oil which is sealed in the hub and isolated from engine oil. This oil provides lubrication and corrosion protection to blade bearings and other internal parts. The oil is dyed red on some models to aid in the troubleshooting of suspected propeller leaks.

NOTE: Periodic maintenance of the lubrication is NOT normally required.

(f) Propeller Start Lock (C600, C650, and C1100 Series only).

1 The propeller has a start lock mechanism installed within the cylinder. The mechanism includes latching weights which will engage a fixed stop to block movement of the piston in the direction of increasing blade pitch beyond a predetermined start lock blade angle. Latch engagement is possible only when the engine is shut off on the ground. When the propeller is rotating, the latch weights move out by centrifugal force so as to offer no interference to operation of the control system in flight. During all normal operating conditions, the weights are in a disengaged position and offer no resistance to feathering, unfeathering, or reversing of the propeller.

NOTE: Special tools (McCauley part number B-5021/2) are required to release start locks manually for maintenance purposes.

B. Description of Turbine Propeller Operating Principles

(1) Propellers are a single acting unit in which hydraulic pressure opposes the forces of springs and counterweights to obtain the correct pitch for engine load. Hydraulic pressure urges blades toward low pitch (increasing RPM), while springs and counterweights urge blades toward high pitch (decreasing RPM).

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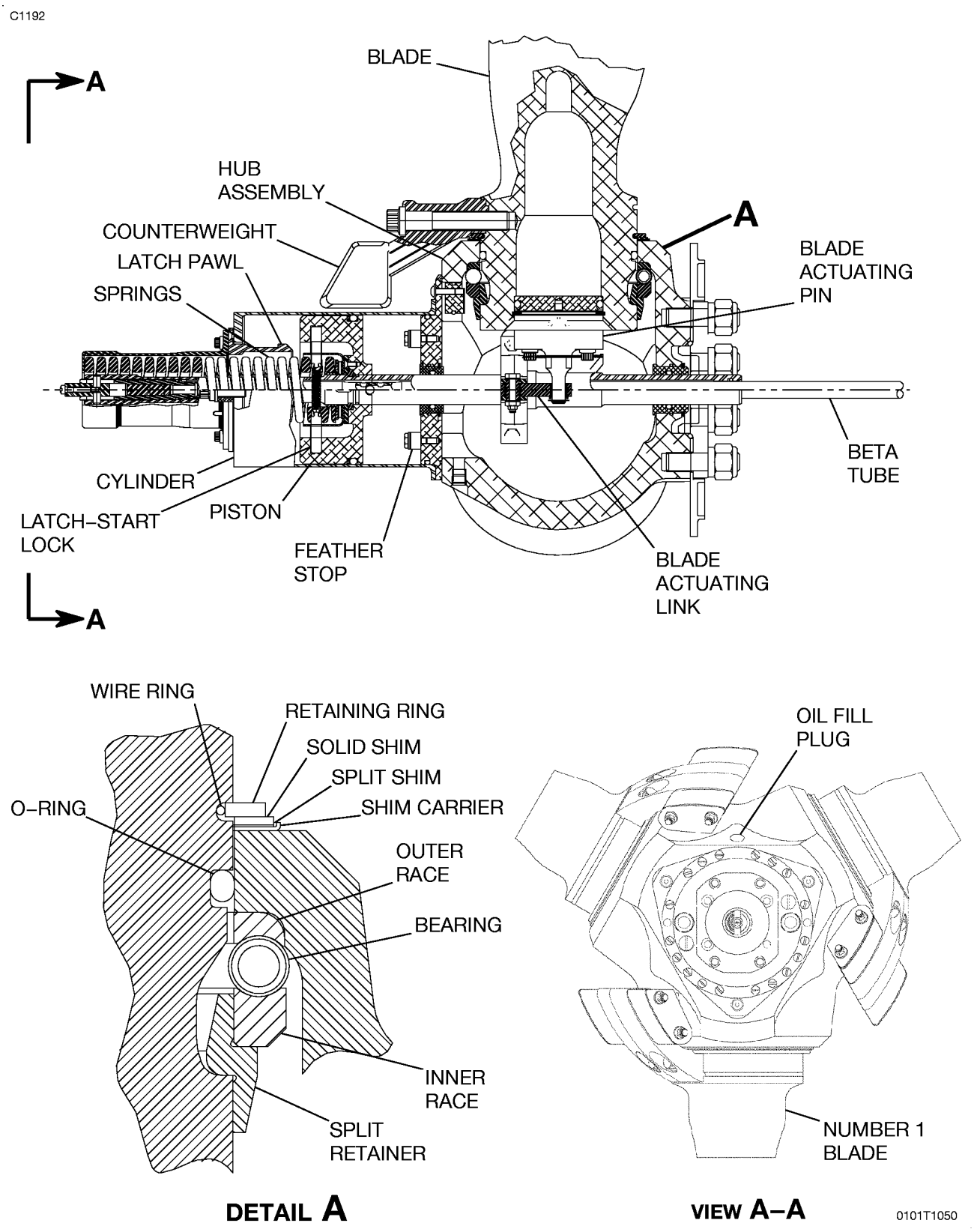

C600 Series Propeller
Figure 5 (Sheet 1)

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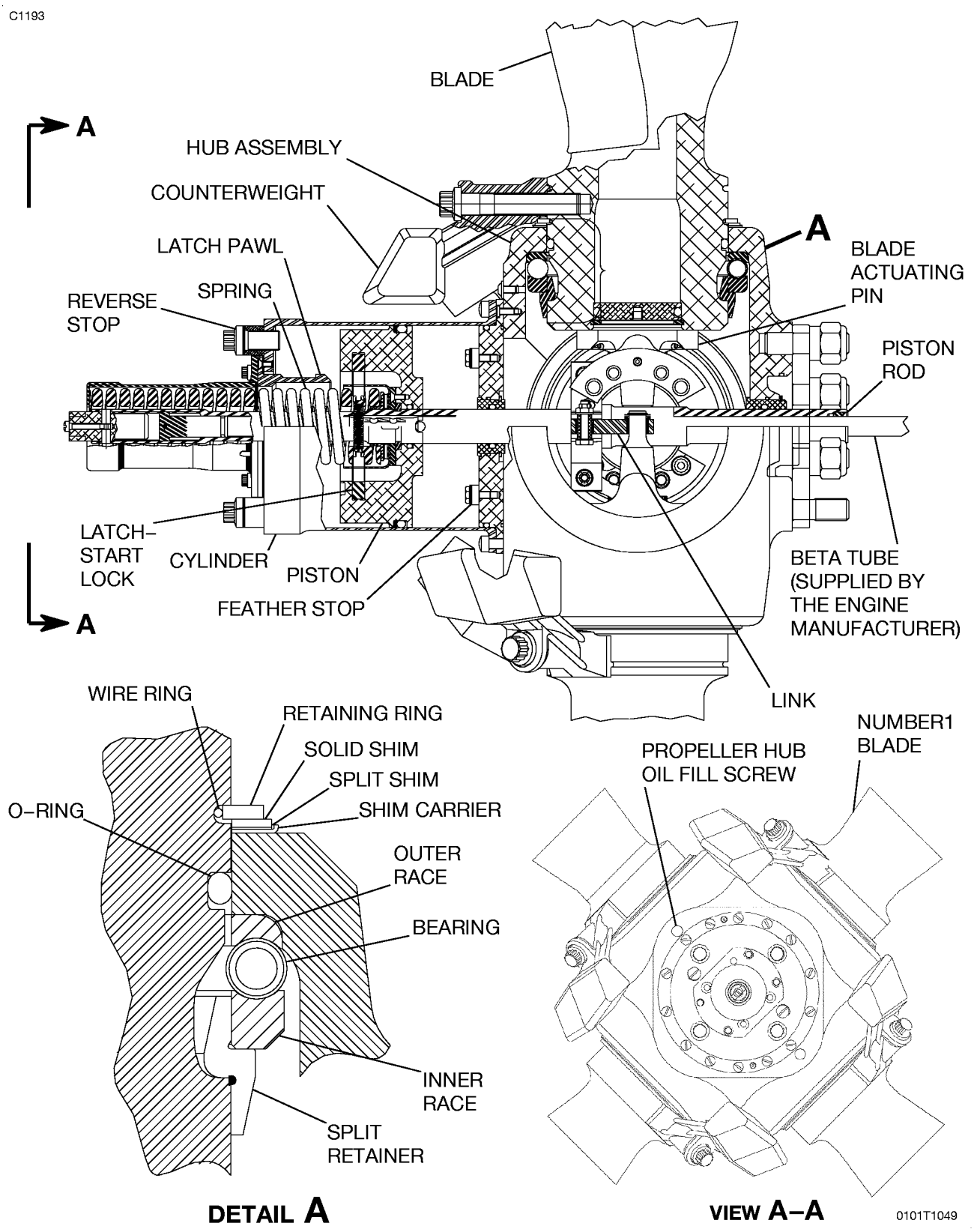

C650 Series Propeller
Figure 6 (Sheet 1)

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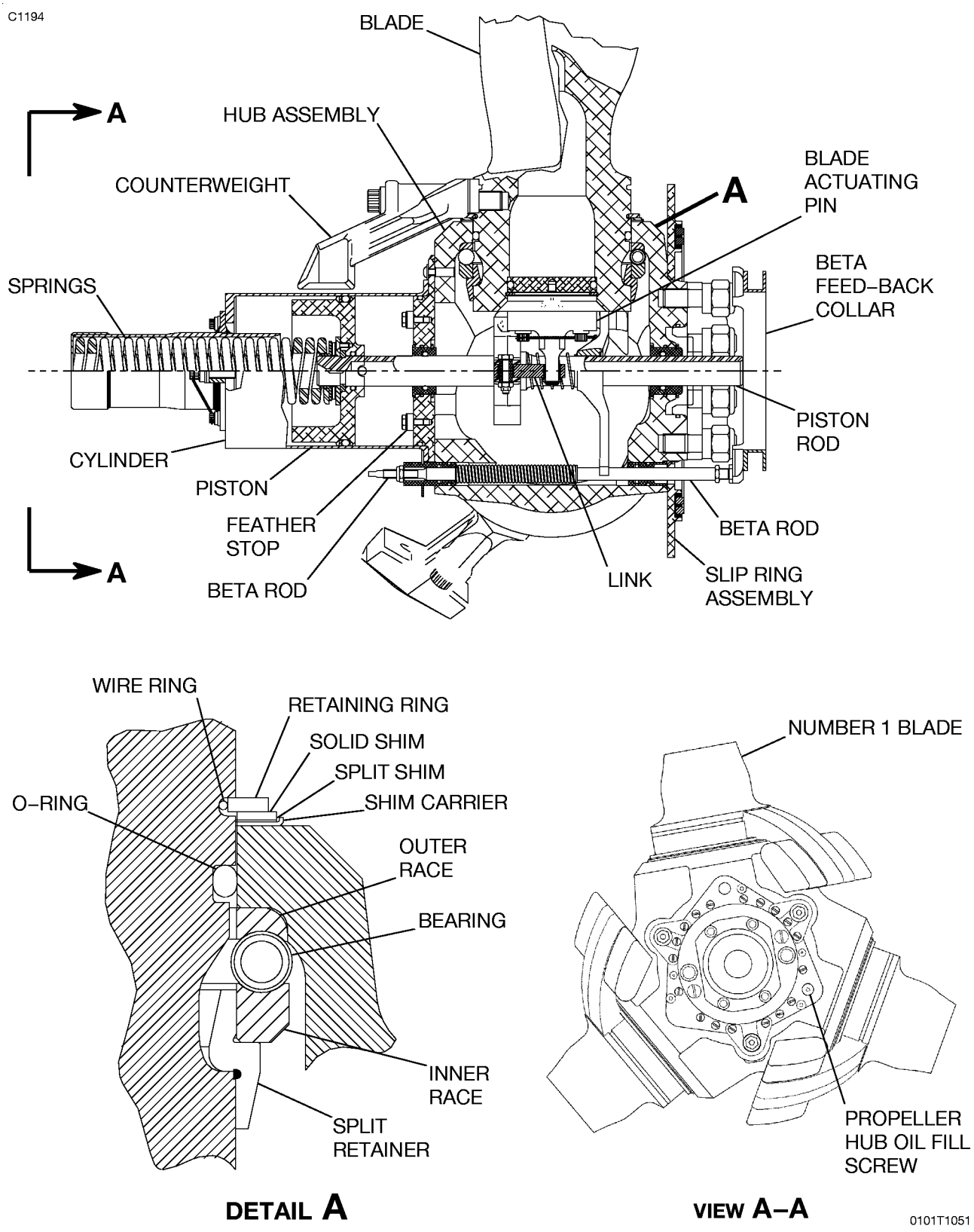

C700 Series Propeller
Figure 7 (Sheet 1)

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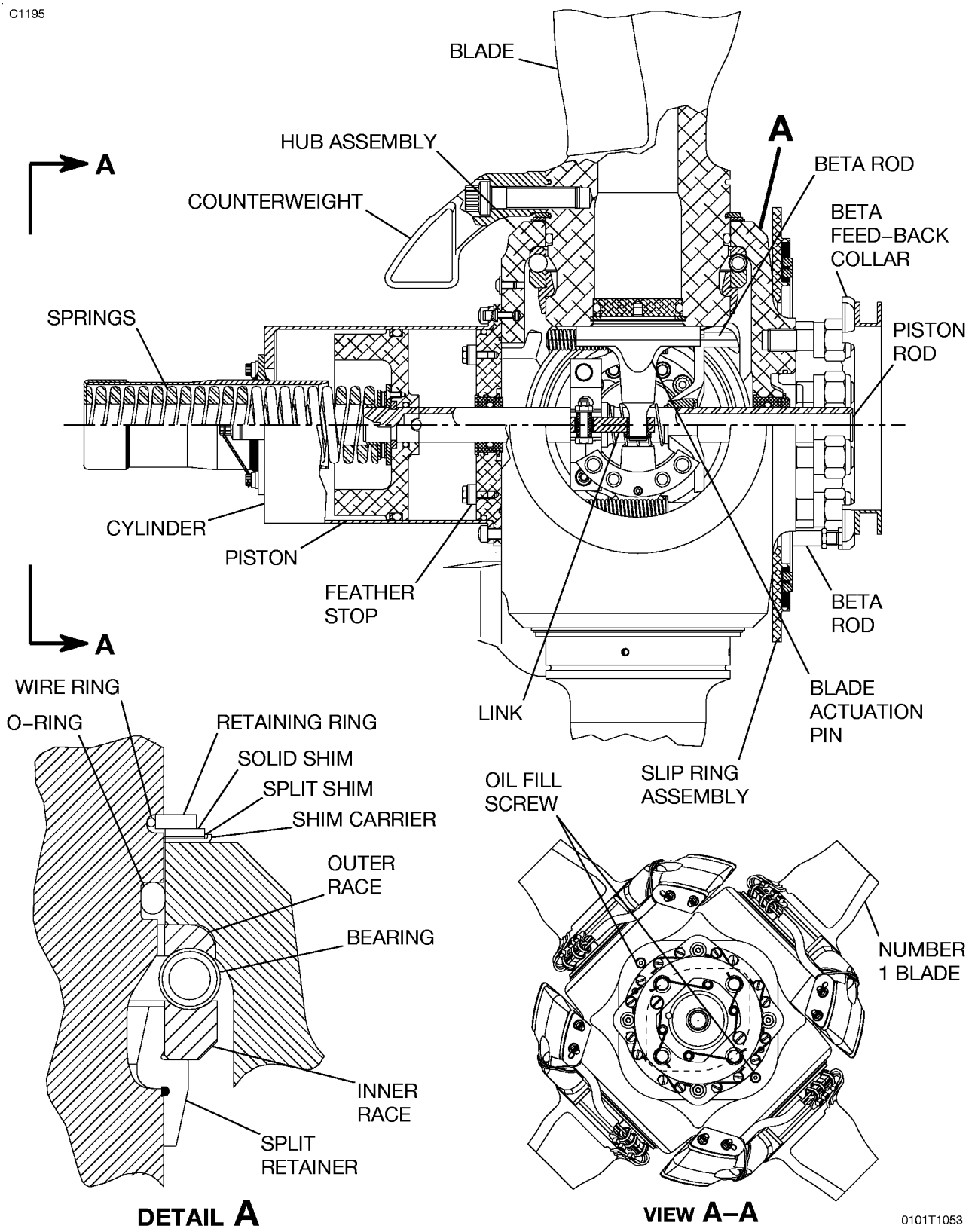

C750 Series Propeller
Figure 8 (Sheet 1)

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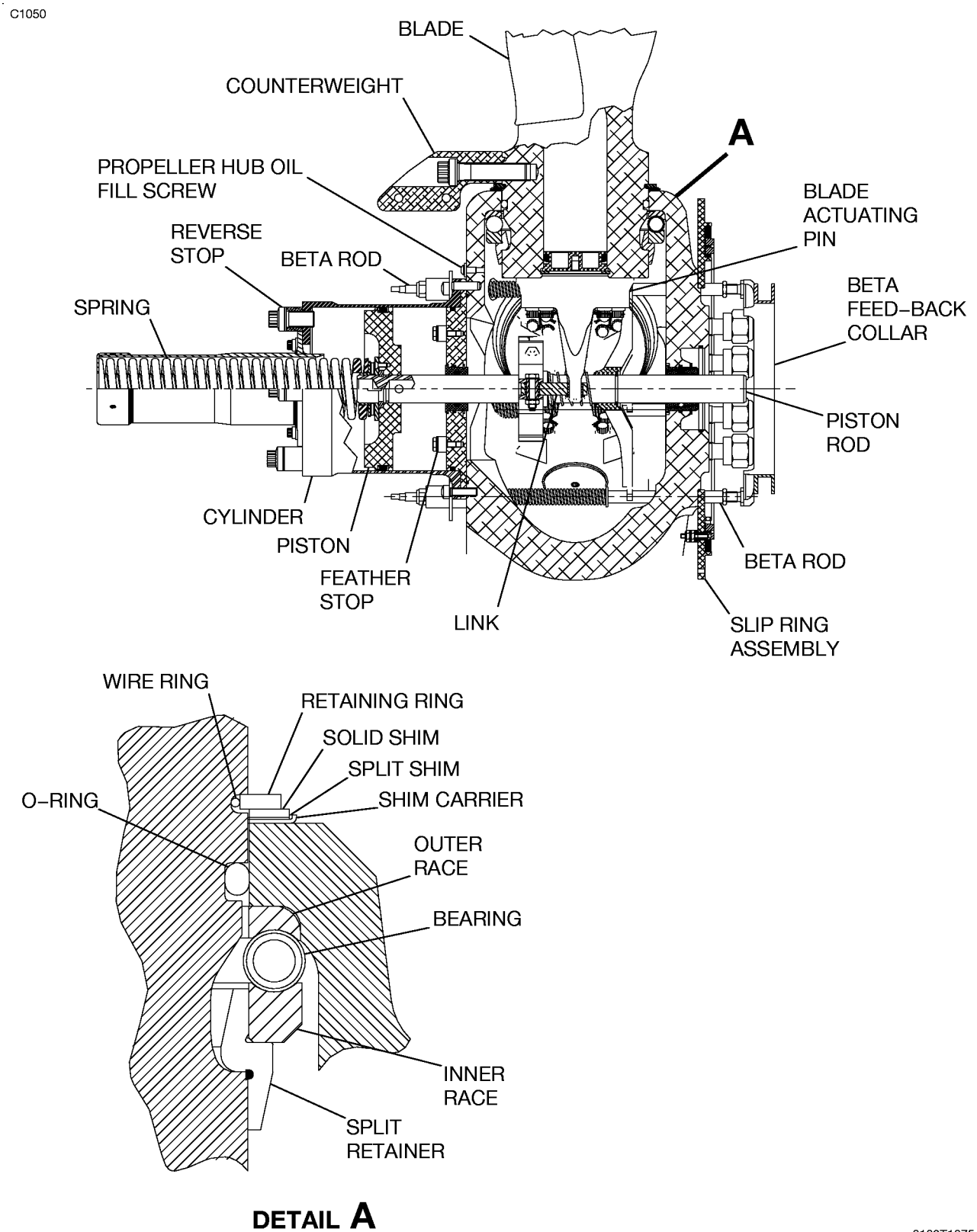
C1050



DETAIL A

0102T1075

C1000 Series Propeller
Figure 9 (Sheet 1)

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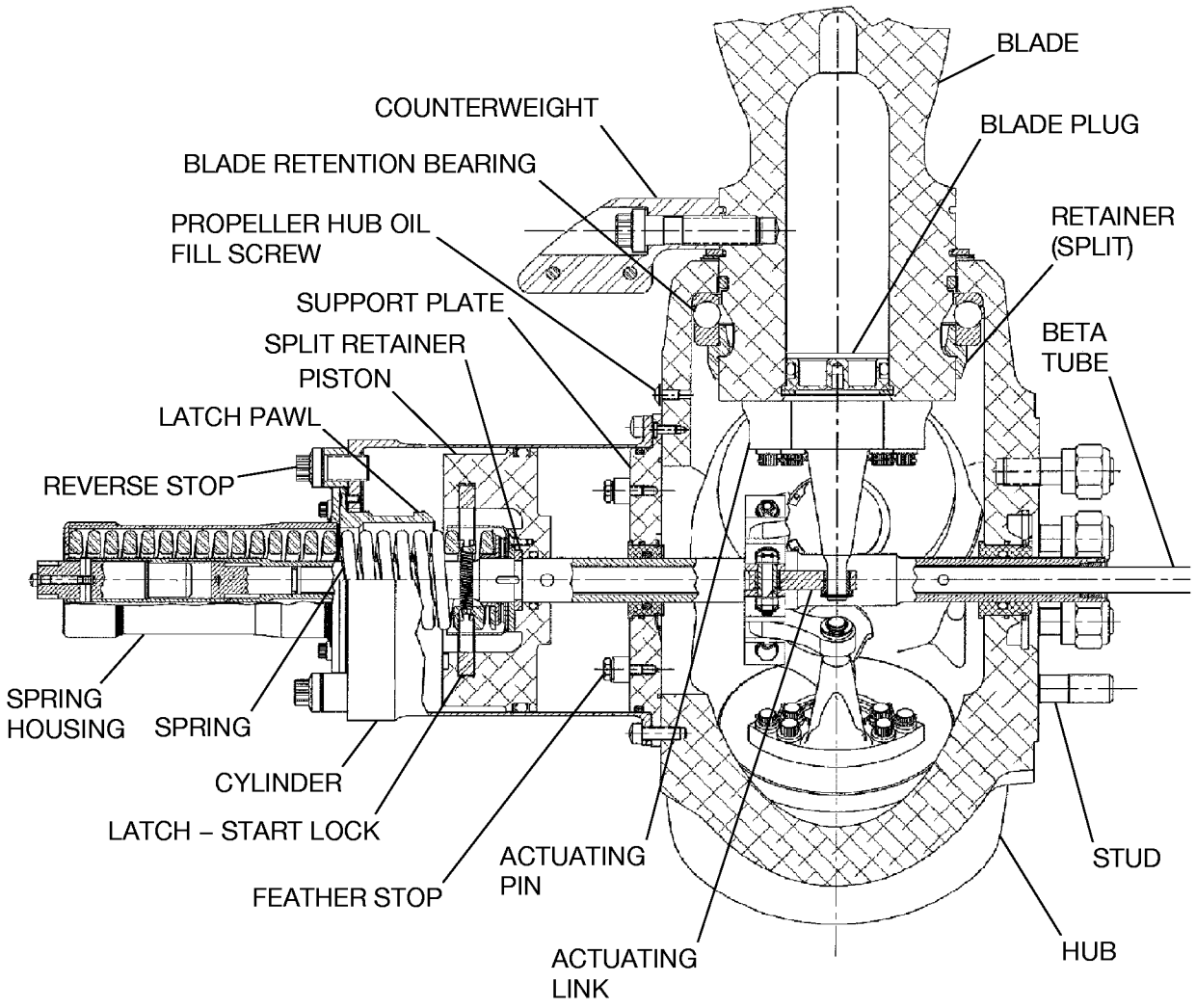
C1196



PROPELLER SECTIONAL DRAWING
C1105

NOTE: THE OIL FLOW (BETA) TUBE IS FURNISHED BY ENGINE MANUFACTURER.

C1100 Series Propeller
Figure 10 (Sheet 1)

© McCauley Propeller Systems

C. The propeller is designed to operate in two modes of operation - beta mode and governor mode:
   (1) Governor Mode - Oil is metered to and from the propeller (by governor control valve as positioned by flyweights), increasing and decreasing blade angle (changing pitch) as required when the propeller speed control setting is altered, or increasing and decreasing pitch to control and stabilize engine speed with varying power conditions or flight attitudes with a fixed speed setting.
   (2) Beta Mode - The pilot may select beta mode for ground reversing or taxi operation by means of the aircraft engine mechanical linkage. The linkage repositions the propeller reversing lever and beta valve to provide access for high pressure oil to reach the propeller piston and move the blades toward reverse pitch.

D. Propeller Deice, refer to Figure 11.

NOTE: Only components sold by McCauley are described. Some OEMs or STC owners may have different designs.

(1) If propeller deice is installed, the components include:
- electrically heated rubber boots
- deice harnesses
- slip ring assembly
- deice timer
- brush block assembly

(a) The brush block, deice harnesses, and slip ring assembly conduct electrical power to the propeller blade deice boot elements which then heat.
(b) The heat melts a layer of the ice which allows the remaining ice to be removed from the propeller blades by centrifugal force.
(c) Deice Harness (if deice is installed) - The deice electrical harnesses connect the deice boots to the slip ring assembly to complete the deice electrical circuit.
(d) Deice Slip Ring Assembly (if deice is installed) - The deice slip ring assembly is constructed of machined aluminum with bronze commutator rings bonded to one side. Studs to attach the deice leads for each blade are located on the propeller side of the platter. These are brazed to the commutator rings and pass through holes provided for that purpose. Slip ring assemblies are secured to the hub or are sandwiched between the hub and the engine flange.

3. Overhaul Period

A. All propellers are to be overhauled at specific intervals. The time between overhaul (TBO) is specified in hours of operation as well as calendar limit. TBO for the propeller can be found in the latest revision of McCauley Service Bulletin 137[X].

NOTE: TBO specification is subject to change. Any changes to TBO will be announced in revisions of McCauley Service Bulletin 137[X].

4. Propeller Model Designation

A. McCauley uses a model designation system to identify specific propellers. This is done by utilizing a combination of hub and blade model designations.

B. Hub Model Designation.
   (1) The hub model designation is steel stamped on the cylinder face of the propeller hub. Examples of hub model designation:

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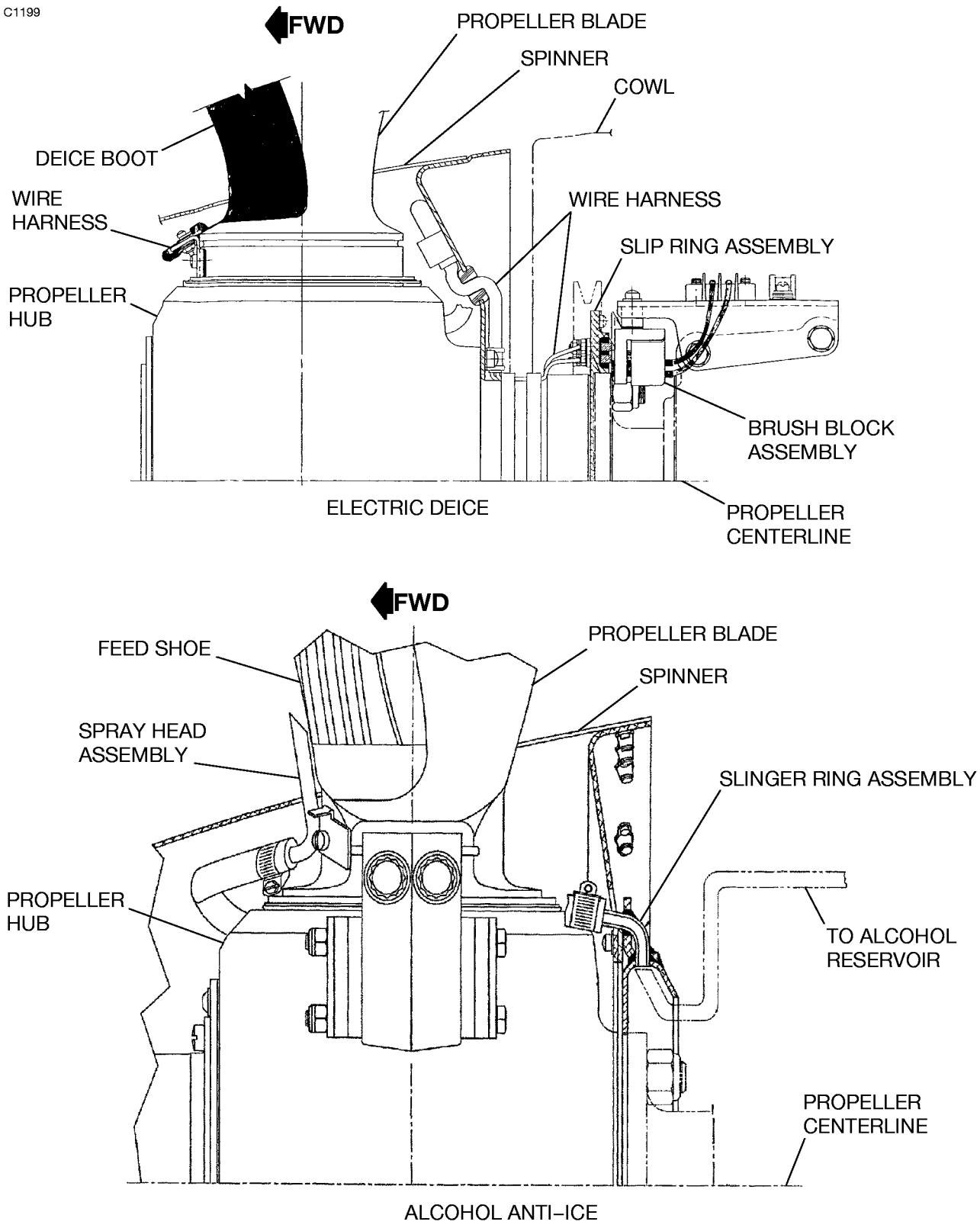

Propeller Deice/Anti-Ice Installation
Figure 11 (Sheet 1)

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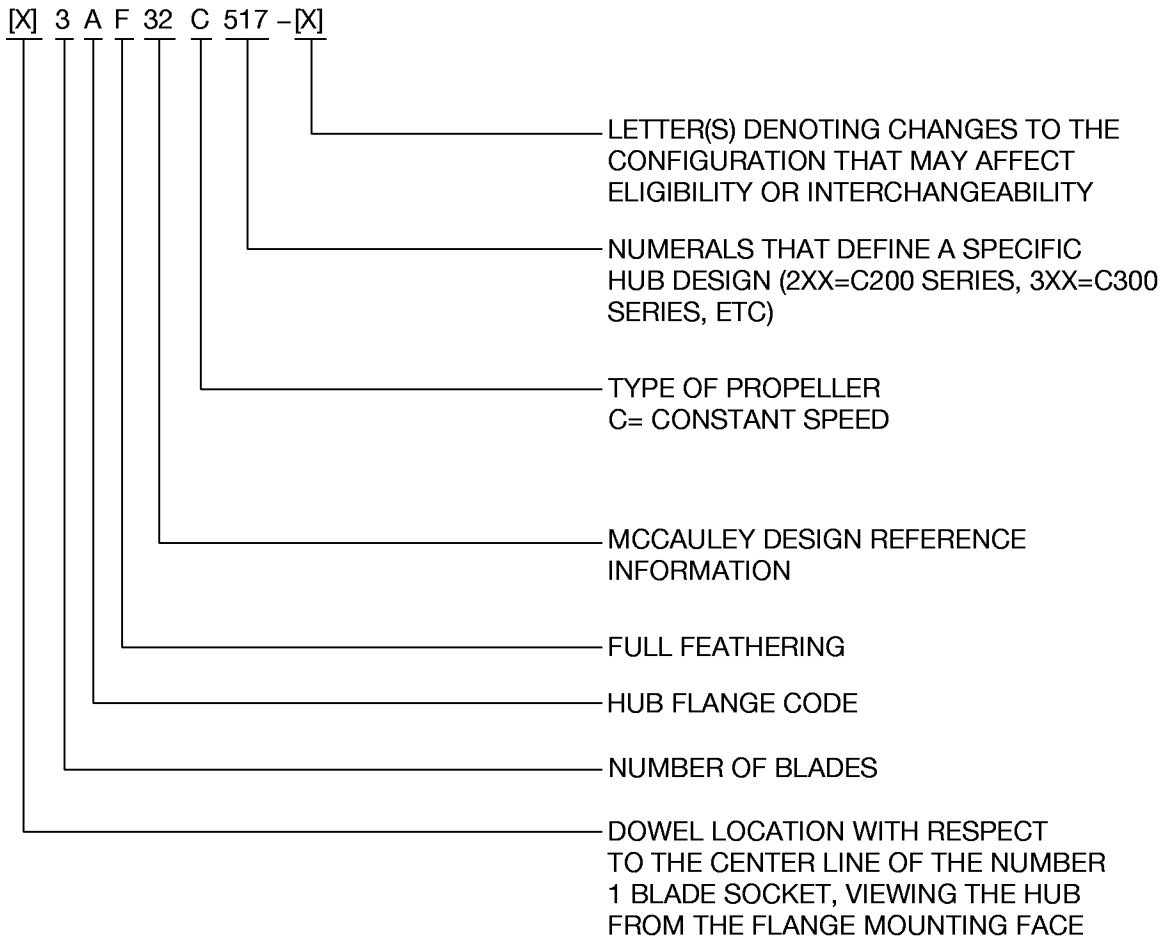
C1030

[X]3AF32C517–[X]- SAMPLE PISTON ENGINE HUB MODEL DESIGNATION


[X] 3 A F 32 C 517 –[X]
LETTER(S) DENOTING CHANGES TO THE CONFIGURATION THAT MAY AFFECT ELIGIBILITY OR INTERCHANGEABILITY
NUMERALS THAT DEFINE A SPECIFIC HUB DESIGN (2XX=C200 SERIES, 3XX=C300 SERIES, ETC)
TYPE OF PROPELLER C= CONSTANT SPEED
MCCAULEY DESIGN REFERENCE INFORMATION
FULL FEATHERING
HUB FLANGE CODE
NUMBER OF BLADES
DOWEL LOCATION WITH RESPECT TO THE CENTER LINE OF THE NUMBER 1 BLADE SOCKET, VIEWING THE HUB FROM THE FLANGE MOUNTING FACE

NOTE: A SPECIFIC PROPELLER ASSEMBLY IS IDENTIFIED BY THE HUB SERIAL NUMBER WHICH IS STAMPED ON THE HUB. ALL RECORDS OF PROPELLER COMPONENTS ARE KEPT WITH REFERENCE TO HUB SERIAL NUMBER. THE FIRST TWO DIGITS OF THE HUB SERIAL ARE THE YEAR OF MANUFACTURE. THE REMAINING DIGITS ARE THE NUMBER OF THE HUB MANUFACTURED IN THAT YEAR.

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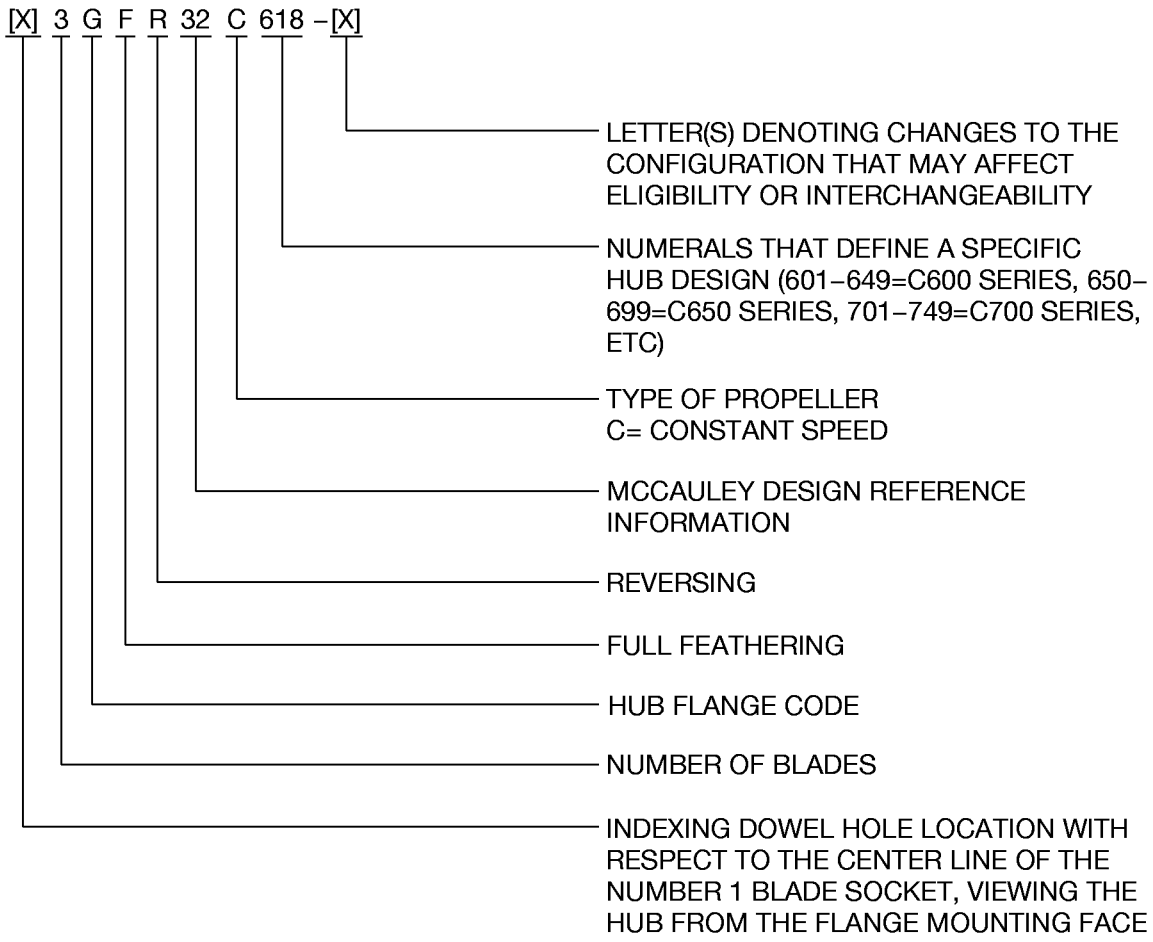
C1031

[X]3GFR32C618–[X]– SAMPLE TURBOPROP HUB MODEL DESIGNATION


[X] 3 G F R 32 C 618 –[X]
LETTER(S) DENOTING CHANGES TO THE CONFIGURATION THAT MAY AFFECT ELIGIBILITY OR INTERCHANGEABILITY
NUMERALS THAT DEFINE A SPECIFIC HUB DESIGN (601–649=C600 SERIES, 650–699=C650 SERIES, 701–749=C700 SERIES, ETC)
TYPE OF PROPELLER C= CONSTANT SPEED
MCCAULEY DESIGN REFERENCE INFORMATION
REVERSING
FULL FEATHERING
HUB FLANGE CODE
NUMBER OF BLADES
INDEXING DOWEL HOLE LOCATION WITH RESPECT TO THE CENTER LINE OF THE NUMBER 1 BLADE SOCKET, VIEWING THE HUB FROM THE FLANGE MOUNTING FACE

NOTE: A SPECIFIC PROPELLER ASSEMBLY IS IDENTIFIED BY THE HUB SERIAL NUMBER WHICH IS STAMPED ON THE HUB. ALL RECORDS OF PROPELLER COMPONENTS ARE KEPT WITH REFERENCE TO HUB SERIAL NUMBER. THE FIRST TWO DIGITS OF THE HUB SERIAL ARE THE YEAR OF MANUFACTURE. THE REMAINING DIGITS ARE THE NUMBER OF THE HUB MANUFACTURED IN THAT YEAR.

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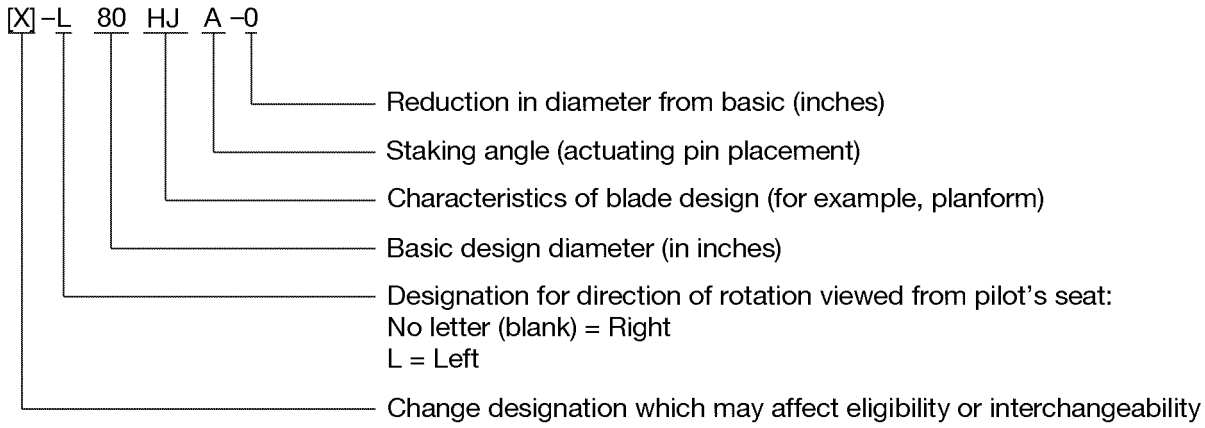
C. Blade Model Designation

(1) All blades are impression stamped on the butt end with blade model designation, propeller type certificate number, and blade serial number. This stamping is not visible from the outside of the propeller assembly. The following is an example of blade model designation:

C1130


[X] –L 80 HJ A –0
Reduction in diameter from basic (inches)
Staking angle (actuating pin placement)
Characteristics of blade design (for example, planform)
Basic design diameter (in inches)
Designation for direction of rotation viewed from pilot's seat:
No letter (blank) = Right
L = Left
Change designation which may affect eligibility or interchangeability

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PROPELLER TROUBLESHOOTING

1. General Information

A. Types of Problems Normally Encountered
   (1) This section outlines and explains a number of operating characteristics which have been observed in service. There is some discussion of propeller design as it relates to these characteristics. Procedures for locating and correcting causes of undesirable operation are given.

2. Operation in Restricted Power or RPM Conditions (Turbine)

A. There are several risks to the propeller blades and or hubs if the propeller is operated in restricted areas.
   (1) Each propeller is subjected to rigorous vibration tests to determine that the conditions under which a particular propeller/engine/airframe combination will operate safely. Certain power settings or RPM ranges are restricted by either the airframe manufacturer and/or McCauley. This is because vibrations produced in the restricted ranges can cause fatigue cracks in the hub or blades. Such cracks could cause catastrophic failures of the propeller and a subsequent crash of the aircraft.

B. Always carefully obey the restrictions published in the aircraft AFM/POH or the POH supplement provided with the STC under which the propeller is installed.

CAUTION: Failure to follow the published limitations for any McCauley propeller, could result in a reduced life or possibly even catastrophic loss of the propeller and/or aircraft.

C. If you are aware that a McCauley propeller has been operated outside the published limitations or in a restricted area, immediately call McCauley Product Support for assistance.

3. Propeller RPM Fluctuations (Constant Speed Piston, Turbine)

A. Symptoms:
   (1) Hunting is a cyclic or constant variation of engine speed, above and below that desired. It will be shown by constant wavering of the tachometer reading.
   (2) Surging is a wide or excessive increase or decrease in engine speed followed by return to the established speed after one or more oscillations.
   (3) Surging will occur and should be considered normal if lever/throttle is moved rapidly.

B. Possible Causes:
   (1) Hunting is seldom, if ever, caused by the propeller itself. Those conditions reported primarily have been caused by other parts of the system such as governor, fuel control, etc.
      (a) The propeller can be tested in flight by reducing the manifold pressure. The propeller control should be in the full RPM position and the manifold pressure should be reduced until the RPM drops slightly. This ensures that the propeller is against its low pitch stop and is eliminated from the equation.
   (2) Surging may be caused by air in the system, defective governor, or problems associated with the engine transfer bearing or collar.
   (3) If the governor test is satisfactory and no other system faults can be found, the propeller may be at fault. Although very rare, hunting and surging may be due to excessive internal pressure in the propeller or overshimming of propeller blades.

C. Corrective Action:
   (1) If the propeller is suspected as the cause, it should be removed for examination by an approved propeller repair station.
   (2) Surging has been encountered on ground operation after initial installation while purging air from system.
      (a) If encountered at other times, the propeller should be cycled repeatedly to remove all air from the system.

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(b) If the condition persists, it may be attributable to the governor, and the governor should be removed and tested. Propeller should be purged again after governor is reinstalled.

4. Changing RPM or Creeping (Constant Speed Piston, Turbine)

A. Propeller RPM changing and holding new setting.
(1) Possible Cause:
(a) Excessive "play" in the linkage between the governor and the cockpit control often leads to erratic operation.
(b) Possible excessive engine compartment heat affecting a plastic top cover.
(2) Corrective Action:
(a) Trace linkage, locate unsecured sections, and tighten as needed.
(b) Please note that although linkage may appear to allow full governor control while the engine is off, it may not in the air. Engine vibration and "stretch" of the mount during operation can often aggravate the condition. Therefore, it is important the entire length of linkage be properly secured.
(c) If heat has distorted the plastic top cover, replace it with an aluminum top cover.

B. Once speed control and power settings are established for a flight attitude (cruise) and then the attitude is altered (to climb) without change of speed and power settings, the engine speed may change slightly.
(1) Possible Causes:
(a) This effect is commonly known as "creeping" of the speed setting. It is a natural result and comes about in the following manner. When speed and power settings are established, the governor control valve will be opened an amount to provide a pressure which balances the propeller counterweight forces and spring load, and an oil flow which is determined by the leakage through the propeller pitch control bearing at that pressure. This will maintain the blade angle such that set power may be absorbed at the desired speed.
(b) If the attitude of the aircraft is altered and the airspeed changes, the blade angle will change to absorb the power at this airspeed. This change in blade angle will cause the forces to vary and consequently will change the control pressure and the propeller pitch control bearing leakage rate.
(c) Since the governor had been adjusted by the speed control for the first set of conditions, the effect will be to change the effective equilibrium speed of the propeller with no change in governor setting. The amount of change varies with engine transfer bearing clearance.
(d) This speed change is generally a negligible amount and is not cause for concern since it is a normal reaction of the control system.
(e) Control-friction lock in the aircraft is faulty.
(2) Corrective Action:
(a) If it is desired that the original speed setting be maintained in the new flight attitude, it may be necessary to alter the propeller control lever as required after the aircraft is trimmed out.
1 Refer to the aircraft maintenance manual.

5. Improper Propeller Static RPM (Piston)

A. Incorrect propeller speed at a given power and static RPM setting.
(1) Possible Cause:
(a) If maximum static RPM is incorrect, the problem can normally be attributed to either incorrect low blade angle or insufficient engine horsepower. However, if the maximum in-flight RPM is incorrect, then an adjustment of the governor may be necessary.

NOTE: On static runs, the propeller should prevent the engine RPM from going to red line. This is done to prevent overspeeding and is a design characteristic of the propeller. However, it should be within 100 RPM of red line.

(2) Corrective Action:
(a) One area that is often at fault for indicated RPM problems is the tachometer. Aviation tachometers can be inaccurate, so begin troubleshooting by verifying the accuracy of the tachometer.

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(b) Verify the propeller low blade angles are correct. This is most effectively done at an approved propeller shop. This is done by measuring the blade angle at the reference station (generally the 30 inch (762 mm) station) and comparing the angles to those listed in either the type certificate of the airframe manufacturer or the STC under which the propeller was installed. If the angles are correct, then the engine is not producing the proper horsepower needed to make the rated static RPM.
(c) Begin troubleshooting the engine.

6. Improper Propeller Maximum RPM in Flight (Constant Speed Piston)

A. Incorrect propeller speed with maximum RPM selected in flight.
(1) Possible Cause:
(a) Inaccurate tachometer reading.
(b) Linkage is out of rig.
(c) Governor stop screw requires adjustment.
(2) Corrective Action:
(a) Repair or replace the tachometer.
(b) Governor stop screw requires adjustment.
1 Do a test flight.
2 Pull the propeller control back until it reaches redline RPM.
3 Allow the RPM to stabilize.
4 Land the aircraft without touching the propeller control lever.
5 Adjust the propeller stop screw to the propeller control location.
6 Rig the aircraft power controls in accordance with the instructions of the manufacturer.
7 Do another flight test to verify the correct setting.

7. Propeller Fails to Control

A. (Constant speed, non-feathering only) Propeller goes to low pitch (high RPM) of its own accord.
(1) Possible Cause:
(a) Governor linkage disconnected.
1 Corrective Action:
a Check and repair governor linkage.
(b) Engine transfer bearing/collar oil leakage rate exceeds specification.
1 Corrective Action.
a Check transfer bearing/collar oil leakage rate per the instructions of the engine manufacturer.
(c) Loss of engine oil pressure.
1 Corrective action:
a Verify the engine oil pressure in accordance with the instructions of the engine manufacturer.
(d) Obstruction in the crankshaft.
1 Correction action:
a Remove propeller and check for obstruction in the crankshaft oil gallery (ie. Rags, shipping plugs, etc.).
(e) Internal governor problem.
1 Corrective Action:
a Have the governor checked by an approved repair station.

NOTE: Failure of an internal governor part may result in metal contamination in the engine oil lubrication system. If internal governor failure is confirmed, the engine and propeller should be checked for metal contamination in accordance with the specifications of the engine manufacturer.

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B. (Feathering propeller) The propeller goes to high pitch or feathers of its own accord. This may occur without warning from otherwise normal operation and may or may not be accompanied by noticeable external oil leakage.
   (1) Possible Cause:
      (a) Incorrectly adjusted governor.
         1 Corrective Action:
            a Have the governor checked by an approved repair station.
      (b) Incorrectly rigged governor.
         1 Corrective Action:
            a Check governor control rigging in aircraft for proper operation.
      (c) Engine transfer bearing/collar oil leakage rate exceeds specification.
         1 Corrective Action.
            a Check transfer bearing/collar oil leakage rate per the instructions of the engine manufacturer.
      (d) Loss of engine oil pressure.
         1 Corrective action:
            a Verify the engine oil pressure in accordance with the instructions of the engine manufacturer.
      (e) Obstruction in crankshaft.
         1 Correction action:
            a Remove propeller and check for obstruction in the crankshaft oil gallery (ie. Rags, shipping plugs, etc.).
      (f) Internal governor problem.
         1 Corrective Action:
            a Have the governor checked by an approved repair station.

               NOTE: Failure of an internal governor part may result in metal contamination in the engine oil lubrication system. If internal governor failure is confirmed, the engine and propeller should be checked for metal contamination in accordance with the specifications of the engine manufacturer.

C. Extreme sluggishness, failure to respond to changes in RPM setting or failure to hold constant RPM with varying aircraft attitude.
   (1) Possible Cause:
      (a) Obstruction in the engine crankshaft.
         1 Correction action:
            a Remove propeller and check for obstruction in the crankshaft oil gallery (ie. Rags, shipping plugs, etc.).
      (b) Internal governor problem.
         1 Corrective Action:
            a Have the governor checked by an approved repair station.

               NOTE: Failure of an internal governor part may result in metal contamination in the engine oil lubrication system. If internal governor failure is confirmed, the engine and propeller should be checked for metal contamination in accordance with the specifications of the engine manufacturer.

      (c) Internal Propeller problem.
         1 Corrective action:
            a Have the propeller checked by an approved repair station.
      (d) Engine transfer bearing/collar oil leakage rate exceeds specification or rotated engine transfer bearing.
         1 Corrective Action.
            a Check transfer bearing/collar condition and oil leakage rate per the instructions of the engine manufacturer.

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8. Propeller Feathers at Shutdown (300, 500, 600, 650, and 1100 Model Series Only)

WARNING: Before starting an engine with a feathered propeller, engine manufacturer should be consulted.

CAUTION: Do not start the engine and do a run-up with the cockpit propeller control lever in the "feather" position. This results in latching mechanism failure.

A. After engine shut down, the propeller may move slowly to the full-feathered position.
   (1) Possible Cause:
      (a) Damaged latch mechanisms, corrosion, dirt, or foreign matter in the mechanism causing latch weights to stick (may be evidenced by intermittent condition).
      (b) Propeller control not set to maximum RPM at shutdown.
   (2) Corrective Action:
      (a) Repair of latching mechanism must be performed by an approved propeller repair station.

9. Propeller Fails to Feather Properly

A. Failure of the propeller to feather normally after the propeller control is moved to the feathering position.
   (1) Possible Causes:
      (a) Lack of feather response may be due to one of the following causes:
         1 Malfunction or incorrect rigging of control linkage.
         2 Misadjusted governor.
         3 High blade turning friction.
         4 Improperly installed deice system.
   (2) Corrective Action
      (a) Check all propeller control rigging for incorrect adjustment. Replace propeller governor with known working unit. If neither of these actions eliminates the problem, the propeller may be at fault. Remove propeller for examination at an authorized propeller repair station.

10. Unusual Aircraft Vibration

A. Apparently excessive vibration felt during normal aircraft operation.
   (1) Possible Causes:
      (a) Although vibration can be caused by the propeller, there are numerous other possible sources of vibration which can make troubleshooting difficult. If the propeller is the cause of the vibration, it is typically due to improper balance, blade track, or linkage problems within the propeller.
      (b) When a propeller is the cause of vibration, the aircraft typically vibrates throughout the entire RPM range although the intensity of the vibration may vary with the RPM. If a vibration occurs at only one RPM or within a limited RPM range, the vibration is not normally due to a propeller problem.
   (2) Corrective Action:
      (a) If the propeller is suspected as the cause of the vibration, the following procedures should be performed:
         1 The ideal troubleshooting method is to temporarily replace the propeller with one which is known to be good and test fly the aircraft. If the vibration is eliminated, the propeller is highly suspect and should be sent to an authorized propeller repair station for evaluation.
         2 If a replacement propeller is unavailable, check the following.
            a Propeller imbalance can be the cause of vibration. Perform a dynamic balance on the suspect propeller to determine balance of the propeller. If the propeller cannot be successfully dynamically balanced, it should be removed and sent to an authorized propeller repair station for evaluation.
            b Check the spinner for cracks at the bulkhead attach points for a cracked bulkhead or for a cracked front support.

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c The propeller spinner can be a contributing factor to an out of balance condition. An indication of this would be a noticeable spinner "wobble" while the engine is running. This condition is normally caused by inadequate shimming of the spinner bulkhead or a cracked or deformed spinner. If a spinner is found to be "wobbling", it should be removed and reinstalled with the proper amount of shims as described in Spinner Installation. Any spinner found cracked must be replaced.

d Check amount of blade twist of each propeller blade when rotated within its socket as shown in Figure 101. Look for variations in the amount of movement of each blade in relation to the other blade(s).

e If excessive blade twist is found in one or more blades in relation to the others, the propeller could have an internal linkage problem. It should be removed and sent to an authorized propeller repair station for evaluation.

NOTE: The amount of total blade twist in each blade is, in itself, usually of no importance. It is a difference in the amount of blade twist from blade to blade that should be considered.

(3) Possible Cause:
  (a) Worn engine mounts.
(4) Corrective Action:
  (a) Consult the OEM or engine mount manufacturer manual for replacement criteria.

11. Blade Shake

A. Symptom:

NOTE: "Blade Shake" is listed in the "Propeller Troubleshooting" section of this manual for informational purposes only as it has been misinterpreted in the past as a possible problem by some operators. Despite it's appearance in this section, it should never be considered a cause for concern or propeller replacement.

(1) Blade shake is the tendency for the blades to wobble slightly when the tip is physically moved by hand from the leading edge to the trailing edge (Refer to Figure 101).
  (a) Total maximum allowable movement up to 0.125 inch (3.13 mm) is considered normal.

B. Cause:
(1) This tendency is the natural result of a tolerance buildup. A very small movement at the hub is magnified many times at the blade tip. It is NOT the source of vibration or any other problems. While the propeller is rotating, centrifugal force on the blades seats them rigidly and positively against the retention bearings in the hub.

C. Corrective Action:
(1) No corrective action is required.

12. Oil or Grease Leaks

A. The presence of oil or grease on propeller blades may or may not indicate a problem.
(1) Grease lubricated propellers may have grease deposits on the blade shank during the first 25 or 50 hours of operation after overhaul because the retaining bearings were packed with an excessive amount of grease.
(2) All propeller blades may show minor grease streaking when new or newly overhauled. Such streaking is normal and is the result of lubricant applied to the blade O-ring during assembly.
(3) Oil-filled propellers may show signs of oil deposited on the blade shank during operation after an overhaul or after a prolonged period of inactivity.

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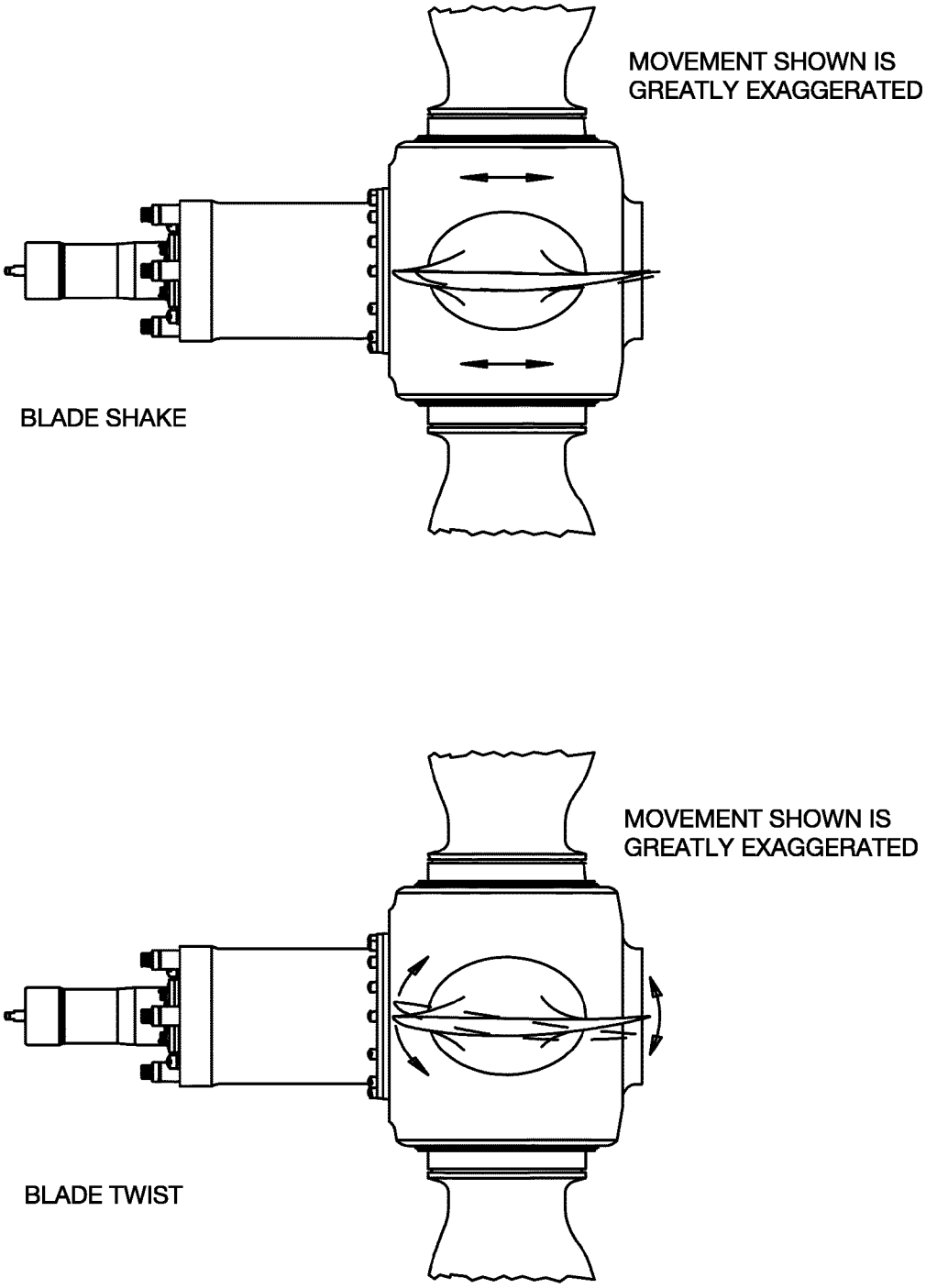
C89



Blade Shake and Blade Twist
Figure 101 (Sheet 1)

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B. Checking and correcting a leaking propeller at the blade.

NOTE: This procedure will only correct blade shank leaks at the blade shank O-ring.

(1) Use a clean cloth dampened with mineral spirits to clean the blade of all traces of oil and dirt.

CAUTION: Never exceed the published engine operational limits.

(2) Run the engine and cycle the propeller at least five times.
  (a) Piston airplanes: cycle from low to high pitch.
  (b) Turbine airplanes: cycle from reverse to high pitch.
(3) Check the blade for signs of continued leakage.
  (a) If necessary, clean the blade again with a cloth dampened with mineral spirits to clean the blade of all traces of oil and dirt.
(4) Run the engine and cycle the propeller at least five times.
  (a) Piston airplanes: cycle from low to high pitch.
  (b) Turbine airplanes: cycle from reverse to high pitch.
(5) If the leak has stopped completely, no other action is required.
(6) If the rate of leak has decreased, it is permissible to continue operation of the propeller for up to 20 hours.
  (a) If there is leakage after 20 hours, the propeller must be removed from the aircraft and sent to an approved propeller shop for repair.
(7) If the rate of leakage increases, do not operate the propeller. Immediately send the propeller to an authorized propeller facility.

C. Oil leaks at locations other than blades.
(1) Piston aircraft propellers.
  (a) Leakage from the cylinder area requires removal of the propeller and repair by an approved propeller facility.
  (b) If leaks are found on any other spot on the blade or the hub, remove the propeller and repair at an approved propeller facility.
  (c) Leaks at the hub/propeller shaft interface requires removal of the propeller and replacement of the rear hub O-ring.
(2) Turbine aircraft propellers
  (a) Leakage from the cylinder or support plate area requires removal of the propeller and repair by an approved propeller facility.
  (b) Leaks at the hub/propeller shaft interface requires removal of the propeller and replacement of the rear hub O-ring.
  (c) A leak from the actuating spring area is engine oil and must be corrected immediately to prevent engine damage from lubrication oil depletion.
  (d) If leaks are found on any other spot on the hub, remove the propeller and repair at an approved propeller facility.

13. Propeller Overspeeding

A. During normal operation, the propeller suddenly overspeeds past rated RPM.
(1) Possible Causes:
  (a) A number of factors can cause propeller overspeeding, but these are normally caused by the engine or governor.
(2) Corrective Action:
  (a) Refer to Service Letter 1998-23, Overspeeding of Propellers, for required action after an overspeed incident.

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PROPELLER FIELD MAINTENANCE PRACTICES

1. Ground Support Equipment

A. The following special equipment is required for field maintenance of McCauley propellers.

NAME	PART NUMBER	MANUFACTURER	USE
Propeller protractor		Commercially available	To measure blade angles on 600, 650, and 1100 Series propellers.
Torque wrench adapter	B-5588	McCauley	To torque turbine propeller mounting nuts.
Feedback collar retractor	D-5945	McCauley	To aid in removal and installation of C700, C750, and C1000 series propellers.
Start lock release tools	B-5021	McCauley	To release start locks on C600, C650, and C1100 series propellers.
Beta tube installation and adjustment tool	B-5378	McCauley	To install and adjust beta tube on C600, C650, and C1100 series propellers.

2. Procedures For Maintenance

A. Maintenance begins with the operator and includes inspection together with regular care. Many maintenance tasks that may be accomplished at a minimum cost can extend the life of the propeller and reduce or prevent costly repairs. The following is a listing of what operators of aircraft CAN and CANNOT DO.

B. Operators CAN do the following:

(1) Perform a visual preflight inspection of the blades for nicks, scratches, dents, erosion, corrosion, cracks, etc. Apparent damage found should be referred to an appropriately rated mechanic. A crack or bend is cause for removal of the propeller.

(2) Check the propeller spinner attaching screws for security and check the spinner for damage.

(3) Check the propeller for evidence of oil or grease leakage.

(4) Clean propeller blades periodically using fresh water, a non-alkaline cleaner and a soft cloth or soft brush. Dry with a soft cloth.

NOTE: Always have the blade pointing down to prevent moisture from collecting in the hub.

(5) Propellers operating in corrosive environments, such as agricultural or costal operations:

(a) Clean the area of the propeller blade snap rings and the propeller hub blade sockets with water, soft bristle brush (do not use a hard bristle brush), and clean towel.

1 Remove as much foreign material from the propeller blade retaining ring area as possible.

(b) Make sure the propeller blade retaining ring area is dry.

(c) Apply LPS 3® Rust Inhibitor to the retaining ring area at the base of the propeller blades and hub sockets.

(d) Apply LPS 3® as frequently as necessary to prevent corrosion.

(6) Ensure that the tachometer is appropriately marked for operational limitations of the propeller and that the tachometer accuracy is checked at periodic inspection intervals.

(7) Make sure that the applicable installation, information, and warning decals are on the propeller. These decals may include warnings against pushing or pulling on the propeller, the model number, the correct bolt torque, dynamic balancing information.

(8) Each propeller should have its own maintenance record.

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(9) The operator must recondition or overhaul the propeller when it reaches the McCauley recommended service time limits. Refer to McCauley Service Bulletin SB137[X] for the latest propeller overhaul intervals.
(10) For safety and glare reduction for conventional single-engine tractor type aircraft, keep the blade backs painted flat black and the propeller tips painted with the appropriate colors to ensure good visibility. Repaint blades equally so that the balance of the propeller is not disturbed. Pusher props may have unique paint color requirements for good visibility for ground personnel. Refer to McCauley's maintenance documents.
(11) McCauley spinners can be polished, use commercially available polishing compounds.

C. Operators CANNOT do the following:
(1) Do not operate any aircraft after a propeller has been subjected to an impact without a thorough inspection by an appropriately rated person or repair facility.
(2) Never straighten a damaged propeller. Even partial straightening of blades to ease shipment to a repair facility may result in hidden damage not being detected and an unairworthy propeller being returned to service.
(3) Never repair any blade defect by welding, heating, or peening. This can induce premature blade failure.
(4) Never chrome plate a spinner. Plating will cause cracks and spinner failure.
(5) Do not attempt to repair or modify a propeller spinner or spinner components. Welding, riveting or bonding are not permitted on the spinner or spinner components.
(6) Do not polish propeller blades unless specifically permitted by McCauley's instructions
(7) Do not fill any damaged areas of metal blades with bulk-filler materials such as epoxy or auto body fillers. This prevents areas of potential cracking from being inspected. Additionally, filling a damaged area will not correct the stress risers caused by the dent or those caused by the loading that introduced the dent.
(8) Do not paint over areas of corrosion on blades. Corroded areas must be removed in accordance with approved procedures prior to applying the approved protective finish.
(9) Do not run up engines in areas containing loose rocks, gravel, or debris. Avoid quartering rear winds during ground run-up because this activity can cause damaging stresses.
(10) Do not push or pull on propeller blades when moving the aircraft by hand. Tow bars are specifically designed for this operation.
(11) Never install a propeller on an aircraft unless it is a model approved by the aircraft type certificate data sheet (TCDS) or an appropriate supplemental type certificate (STC). The service history must be properly documented, and a pre-installation inspection must indicate that the propeller is airworthy.

3. Fixed Pitch Propeller Removal and Installation

A. General
(1) Propeller removal and installation should be performed only by qualified maintenance personnel. The following instructions are general in nature. The aircraft maintenance manual or STC installation instructions should always be consulted for any specialized procedures applicable to a specific aircraft. Various spinner arrangements not manufactured by McCauley may be used which require additional procedures.
(2) In the following instructions, installation of propeller is based on the assumption that a McCauley spinner will be used. If a spinner is not used or if the spinner is not manufactured by McCauley, omit those steps which apply to the spinner.

WARNING: Verify that engine magnetos have been grounded prior to approaching propeller.

B. Spinner Assembly Removal
(1) Make an alignment mark on the spinner shell and adjacent blade with a felt tip pen. This index mark ensures accurate restoration of spinner shell position to lessen the distortion of any dynamic balance previously performed on the propeller assembly.
(2) Remove screws and washers from the spinner and fillet assemblies (if fillet assemblies are installed).
(3) Remove spinner from the bulkhead and fillet assemblies (if fillet assemblies are installed).

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(4) Remove the spinner support and shims from the front of the propeller cylinder, if installed.
(5) If required, remove screws and washers attaching fillets to bulkhead and remove fillets. Identify location of each fillet to the bulkhead.

NOTE: On some spinner assemblies, the fillets are riveted in place and cannot be removed from the bulkhead assembly.

C. Propeller Removal
(1) Remove cowling as required for access to mounting nuts.

NOTE: Not all propellers use nuts to secure the propeller mounting nuts.

(2) Remove the safety wire from the bolts if installed on Continental engine installations. For Lycoming installations, remove safety wire from bolts.
(3) Break the torque on the propeller mounting bolts and nuts.
(4) Support the propeller, remove the mounting bolts and remove the propeller from the engine crankshaft flange.
(5) Place the propeller on a suitable work surface.

D. Propeller Installation

NOTE: McCauley recommends that propeller mounting nuts (if applicable) be replaced at each propeller installation, whenever possible. However, nuts may be reused providing threads are in good condition and the locking material prevents turning of the nut on the stud by hand.

(1) Refer to McCauley Fixed Pitch Service Manual, P/N 730720, latest revision for illustrated exploded views and the applicable parts list for the required parts used with the individual propeller installation.
(2) Dowel and spacer assembly.
(a) Refer to the applicable propeller assembly exploded view in the McCauley Fixed Pitch Service Manual and install dowels and spacers as illustrated.

NOTE: Refer to the McCauley Fixed Pitch Service Manual for the location of the dowels in the spacer. When dowels are in position, the dowels will be engaged approximately half in the spacer or crankshaft flange and half in the propeller hub.

(b) The assembled propeller, dowel and spacer should be a press fit and not separate easily.

E. Refer to the latest revision of McCauley Service Bulletin SB227(X), Propeller Installation Mounting Torque for the correct installation torque values for propeller mounting hardware.

F. Assembly of the spinner installation is completed as the propeller is installed on the engine crankshaft flange. Some installations have the spinner rear bulkhead held between the propeller hub and the spacer. Other installations may have the front bulkhead clamped by the mounting bolts or nuts and the rear bulkhead clamped between the propeller and the crankshaft flange or starter ring gear. Some installations use a spacer support pressed into the front propeller hub bore.

G. Assemble the propeller installation as follows:
(1) Tighten the propeller mounting bolts with the correct torque. The mounting bolt torque for McCauley fixed pitch propellers is determined by the bolt diameter. Refer to the following table to determine the correct torque for the propeller mounting bolts.

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Bolt or Nut Diameter (Inch)	Torque (Dry)		
	Foot Pounds	Inch Pounds	N-m
3/8	25 to 35	300 to 360	33.895 to 40.675
7/16	40 to 45	480 to 540	54.233 to 61.012
1/2	55 to 65	660 to 780	74.570 to 88.128

(2) For propeller mounting bolts with drilled heads, install lockwire between pairs of bolt heads.
(3) When shims are required for location of spinner support, select quantity and thickness so that spinner shell screw holes are misaligned with the rear bulkhead holes or nuts by 1/2 hole diameter. Use at least one mylar shim to contact bolt heads.
(4) When the correct number of shims has been determined, press or lightly tap support into hub bore, apply force to spinner shell toward propeller to align screw holes with bulkhead holes or nuts and install washers and screws.

4. Constant Speed Reciprocating Engine Propeller Removal and Installation (Piston)

A. General
(1) Propeller removal and installation should be performed only by qualified maintenance personnel. The following instructions are general in nature. The aircraft maintenance manual or STC installation instructions should always be consulted for any specialized procedures applicable to a specific aircraft. Various spinner and deice arrangements not manufactured by McCauley may be used which require additional procedures.
(2) In the following instructions, installation of propeller is based on the assumption that a McCauley spinner will be used. If a spinner is not used or if the spinner is not manufactured by McCauley, omit those steps which apply to the spinner.

WARNING: Verify that engine magnetos have been grounded prior to approaching propeller.

B. Spinner Assembly Removal
(1) Make an alignment mark on the spinner shell and adjacent blade with a felt tip pen. This index mark ensures accurate restoration of spinner shell position to lessen the distortion of any dynamic balance previously performed on the propeller assembly.
(2) Remove screws and washers from the spinner and fillet assemblies.
(3) Remove spinner from the bulkhead and fillet assemblies.
(4) Remove the spinner support and shims from the front of the propeller cylinder.
(5) If required, remove screws and washers attaching fillets to bulkhead and remove fillets. Identify location of each fillet to the bulkhead.

NOTE: On some spinner assemblies, the fillets are riveted in place and cannot be removed from the bulkhead assembly.

C. Propeller Assembly Removal
(1) Remove cowling as required for access to mounting nuts.
(2) If required, remove deice leads.
(3) Place a drip pan under the propeller mounting surface to catch any spilled engine oil when the propeller is removed.
(4) Break the torque on the propeller mounting nuts on Continental engine installations. For Lycoming installations, remove safety wire from bolts and break the torque.
(5) Install propeller sling and attach to hoist. If a hoist is not available, the propeller may be supported and lifted by hand.
(6) Take up slack on the propeller sling and hoist, or support propeller, and remove the nuts or bolts.

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CAUTION: Propeller must be removed from engine in a straight motion. Any rocking on the engine could cause damage to the propeller mounting flange.

(7) Carefully slide the propeller forward and remove from the engine.
(8) Place propeller on a suitable support or propeller stand.
(9) Install protective cover over propeller hub mounting flange.
(10) Install protective cover over open end of engine propeller flange.

D. Propeller Assembly Installation

NOTE: McCauley recommends that propeller mounting nuts (if applicable) be replaced at each propeller installation, whenever possible. However, nuts may be reused providing threads are in good condition and the locking material prevents turning of the nut on the stud by hand.

(1) If required, attach bulkhead mounting ring or bulkhead to hub.
(2) Remove protective cover from end of engine propeller flange.
(3) Ensure that engine propeller flange, hub mounting flange, dowels and holes, mounting studs and holes are clean, dry, and free of damage and foreign material.
(4) Remove protective cover from propeller hub mounting flange.
(5) Ensure that a new McCauley O-ring (A-1633-3 or A-1633-49, Continental engines) (A-1633-11, Lycoming engines) is installed in the groove of propeller hub mounting flange. Lubricate O-ring with engine oil prior to installation of propeller.
(6) Position propeller close to engine propeller flange and align dowel pins with the dowel pin holes if applicable.

CAUTION: Propeller must be installed straight onto engine flange. Any cocking of propeller relative to flange could result in damage to engine/ propeller flange mating surfaces.

(7) Mount the propeller on engine propeller shaft. Trap the bulkhead between hub and engine mounting flange if applicable.
(8) Ensure threads of nuts and studs are free of burrs, nicks, and similar damage, and clean of foreign material.

WARNING: If the lubricant is not applied as required, the nuts will be under torqued, and the propeller could fail.

(a) For Continental, Franklin, and Orenda engine installations:

CAUTION: Do not use oil as a substitute for approved lubricant. It is imperative that the correct specification of lubricant be used during installation. Substitution of the approved grease with an unapproved lubricant (or no lubricant) could result in under-torquing or severe over-torquing of propeller attaching parts.

1 Lubricate the threads of studs and nuts and the faces of nuts, spacers, or washers with MIL-PRF-83483 (McCauley part number A-1637-16) grease.
2 Install mounting nuts on mounting studs.
3 Torque the mounting nuts in an alternating sequence to prevent the hub cocking on the engine flange.
4 When the hub is seated fully on the engine flange, torque to the specification called out in the mounting decal located on propeller hub at the number 1 socket.
5 After you apply the final torque, apply torque seal to nut and stud threads.

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WARNING: Threads must be clean and dry. If any lubricant is applied, the attaching parts will be severely over-torqued.

(b) For Lycoming engine installations:
1 Start threads on all propeller mounting bolts and then tighten them in an alternating sequence to prevent the hub cocking on the engine flange.
2 When the hub is seated fully on the engine flange, torque to the specification called out on the mounting decal located on propeller hub at the number 1 socket.
3 Safety wire the nuts in pairs to complete the installation.
(c) If required, install the deice leads.

(9) If an adaptor or extension is attached to torque wrench drive end and this adds to its length, then the actual applied torque will be greater than the dial reading. The following formula should be used to find what the dial should read in order to obtain the correct applied torque:

$$\frac{\text{(actual torque required) x (torque wrench length)}}{\text{(torque wrench length) + (length of the adapter)}} = \text{Torque Wrench Reading to Achieve the Required Actual Torque}$$

E. Spinner Installation (if applicable)

CAUTION: Under-shimming or over-shimming of the spinner front support could result in spinner wobble, vibration, and/or bulkhead and spinner cracking. Follow shimming procedures carefully.

(1) If required, install propeller spinner fillets on the bulkhead with screws and washers.
(2) Insert the same number of shims into spinner support as were removed, and lightly press the spinner support onto propeller cylinder.
(3) Put the spinner shell onto the bulkhead and fillet assembly with the alignment marks matched.
(a) Press firmly aft on the spinner.
(b) Make sure the spinner holes are approximately one-half hole diameter forward of the matching holes in the bulkhead.
(c) Add or subtract shims to spinner support until spinner shell mounting holes are approximately half a hole from being in true alignment with bulkhead holes.
(4) Push on the spinner shell and use an awl or a small punch in an adjacent hole to move the spinner shell screw hole into alignment with bulkhead hole and install washer and screw. Repeat this procedure on opposing holes until eight evenly spaced screws and washers are installed.
(5) Secure propeller spinner to the bulkhead and fillet assemblies with remaining screws and washers.

5. C600/C650/C1100 Series Propeller Removal and Installation

A. General
(1) Propeller removal and installation should be performed only by qualified maintenance personnel. The following instructions are general in nature. The aircraft maintenance manual or STC installation instructions should always be consulted for any specialized procedures applicable to a specific aircraft. Various spinner and deice arrangements not manufactured by McCauley may be used which require additional procedures.
(2) In the following instructions, installation of propeller is based on the assumption that a McCauley spinner will be used. If a spinner is not used or if the spinner is not manufactured by McCauley, omit those steps which apply to the spinner.

B. Spinner Assembly Removal
(1) Make an alignment mark on the spinner and an adjacent blade with a felt tip pen. This index mark insures accurate restoration of spinner position to lessen the distortion of any dynamic balance previously performed on the propeller assembly.
(2) Remove screws and washers from spinner and fillet assemblies.
(3) Remove spinner from the bulkhead and fillet assemblies.
(4) Remove spinner support and shims from spinner.

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(5) Remove screws and washers attaching fillets to the bulkhead and remove the fillets.

C. Propeller Assembly Removal

NOTE: Propeller must be on start locks when beginning this procedure.

(1) Feather the propeller. For details refer to Start Lock Release Procedures in Constant Speed Propeller System Description and Operating Principles.
(2) Place a drip pan under the propeller mounting surface to catch any spilled engine oil when the propeller is removed.
(3) Break the torque on the propeller mounting nuts. (McCauley Torque Wrench Adapter part number B-5588 may be used to gain easier access to mounting nuts.) (Refer to Figure 201).
(4) Install propeller sling and attach to hoist. If hoist is unavailable, propeller may be supported and lifted by hand. This will require additional personnel.

CAUTION: The C600 propellers weigh approximately 120 pounds (54 kg) and the C650 propellers approximately 160 pounds (73 kg). C1100 series propellers weigh 180 pounds (83 kg) or more.

(a) Hoist straps must be a minimum of 4 inches (100 mm) wide.
(5) Take up the slack on the propeller sling and hoist, or have at least four persons support the propeller, and remove the nuts.
(6) Carefully slide the propeller forward and remove from the engine.
(7) Place the propeller on a suitable support or propeller stand.
(8) Install a protective cover over the propeller hub mounting flange.
(9) Install a protective cover over the open end of the engine propeller flange.

D. Propeller Installation

NOTE: McCauley recommends that the propeller mounting nuts (McCauley part number A-1639-32) be replaced at each propeller installation, whenever possible. However, nuts may be reused if the locking material prevents turning of the nut on the stud by hand.

(1) Remove protective cover from the end of engine propeller flange.
(2) Make sure the flange is clean and free of nicks and burrs.
(3) Make sure that the engine propeller flange, dowels, and mounting stud holes are clean, dry, and free of nicks and burrs.
(4) Remove the protective cover from the propeller hub mounting flange.
(5) Make sure that the propeller hub mounting flange, dowel pin holes, and mounting studs are clean and undamaged.
(6) Make sure that a new O-ring is installed in the groove of propeller hub mounting flange. Lubricate the O-ring with engine oil prior to installation of propeller.
(7) Hoist straps must be a minimum of 4 inches (100 mm) wide.
(8) Use a propeller sling and hoist, or additional personnel, to position the propeller close to the engine propeller flange and align engine flange dowel pins with the dowel pin holes on the propeller hub mounting flange. Rotate engine propeller mounting flange as required to align the dowel pin holes.

CAUTION: Propeller must be installed straight onto the engine flange. Any cocking of the propeller with respect to the flange could result in damage to the engine/propeller flange mating surfaces.

(9) Mount the propeller on the engine propeller shaft.
(10) Make sure threads of nuts and studs are free of burrs, nicks, and similar damage, and clean of foreign material.
(11) McCauley Torque Wrench Adapter:

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CAUTION: If an adaptor or extension (such as McCauley part number B-5588) is attached to torque wrench drive end and this adds to its length, then the actual applied torque will be greater than the dial reading. The following formula should be used to find what the dial should read in order to obtain the correct applied torque:

$$\text{Dial Reading} = \frac{\text{Torque Wrench Length x Desired Torque}}{\text{Torque Wrench Length + Extension Length}}$$

(12) Make sure of proper rigging of engine controls. Refer to aircraft maintenance manual.
(13) Do a propeller blade angle check. For details refer to Blade Angle Checking and Adjustment in Propeller Field Maintenance Practices.

E. Spinner Installation

CAUTION: Undershimming or overshimming of the spinner aft bulkhead could result in spinner wobble, vibration, and/or bulkhead and spinner cracking. Please follow shimming procedures carefully.

(1) Install propeller spinner fillets on the bulkhead with screws and washers if required.
(2) Insert shims into the spinner support and lightly press spinner support onto the cylinder on the front end of the propeller.
(3) Mount the spinner onto the bulkhead and fillet assembly and check alignment of the mounting holes in the spinner and bulkhead.
  (a) Make sure that alignment marks on the spinner and propeller blade are matched.
  (b) Add or subtract shims to the spinner support until spinner mounting holes are aligned within one-half hole with the bulkhead mounting hole diameters while you push hard on the spinner shell.
(4) Use an awl or a small punch in an adjacent hole to move the spinner screw hole into alignment with the bulkhead hole and install the screw. Repeat the procedure on opposing holes until eight equally spaced screws and washers are installed.
(5) Secure the propeller spinner to the bulkhead and fillet assemblies with the remaining screws and washers.

6. C700/C750/C1000 Propeller Removal/Installation

A. General
(1) Propeller removal and installation should be performed only by qualified maintenance personnel. The following instructions are general in nature. The aircraft maintenance manual or STC installation instructions should always be consulted for any specialized procedures applicable to a specific aircraft. Various spinner and deice arrangements not manufactured by McCauley may be used which require additional procedures.
(2) In the following instructions, installation of propeller is based on the assumption that a McCauley spinner will be used. If a spinner is not used or if the spinner is not manufactured by McCauley, omit those steps which apply to the spinner.

B. Spinner Assembly Removal
(1) Make an alignment mark on the spinner and an adjacent blade with a felt tip pen. This index mark insures accurate restoration of spinner position to lessen the distortion of any dynamic balance previously performed on the propeller assembly.
(2) Remove screws and washers from spinner and fillet assemblies.
(3) Remove spinner from the bulkhead and fillet assemblies.
(4) Remove spinner support and shims from spinner.
(5) Remove screws and washers attaching fillets to the bulkhead and remove the fillets.

C. Propeller Assembly Removal
(1) Feather the propeller.

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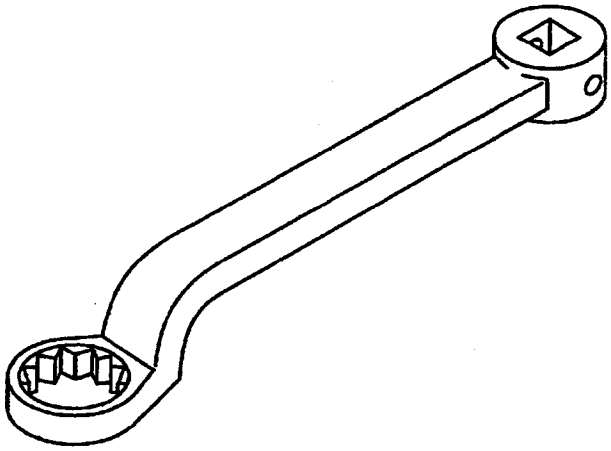
C72



Propeller Torque Wrench Adapter Tool
Figure 201 (Sheet 1)

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(2) Place a drip pan under the propeller mounting surface to catch any spilled engine oil when the propeller is removed.
(3) Remove the feedback bearing assembly from the feedback collar groove. Refer to the aircraft or engine manual for procedure.
(4) Remove the cowling as required for access to the mounting nuts.
(5) Install the D-5945 feedback collar retractor tool to the beta rods.

NOTE: Make sure the rods are inserted through the correct holes of the tool. The beta rods must be pulled directly forward.

CAUTION: Do not draw the feedback collar too far forward as the beta rods will be damaged.

(6) Turn the large threaded rod of the retractor tool clockwise to draw the feedback collar forward to allow access to the propeller mounting nuts.
(7) Break the torque on the propeller mounting nuts. (McCauley Torque Wrench Adapter part number B-5588 may be used to gain easier access to mounting nuts.) (Refer to Figure 201).
(8) Install propeller sling and attach to hoist. If hoist is unavailable, propeller may be supported and lifted by hand. This will require additional personnel.

CAUTION: The C700 propellers weigh approximately 120 pounds (54 kg), the C750 propellers approximately 140 pounds (64 kg). C1000 series propellers weigh 180 pounds (83 kg) or more.

(a) Hoist straps must be a minimum of 4 inches (100 mm) wide.
(9) Take up the slack on the propeller sling and hoist, or have additional personnel support the propeller, and remove the nuts.
(10) Carefully slide the propeller forward and remove from the engine.
(11) Place the propeller on a suitable support or propeller stand.
(12) Install a protective cover over the propeller hub mounting flange.
(13) Install a protective cover over the open end of the engine propeller flange.
(14) Remove the D-5945 feedback collar retractor tool from the propeller.

D. Propeller Installation

NOTE: McCauley recommends that the propeller mounting nuts (McCauley part number A-1639-32) be replaced at each propeller installation, whenever possible. However, nuts may be reused if the locking material prevents turning of the nut on the stud by hand.

(1) Install the D-5945 feedback collar retractor tool on the propeller.
(2) Remove protective cover from the end of engine propeller flange.
(3) Make sure the flange is clean and free of nicks and burrs.
(4) Make sure that the engine propeller flange, dowels, and mounting stud holes are clean, dry, and free of nicks and burrs.
(5) Remove the protective cover from the propeller hub mounting flange.
(6) Make sure that the propeller hub mounting flange, dowel pin holes, and mounting studs are clean and undamaged.
(7) Make sure that a new O-ring is installed in the groove of propeller hub mounting flange. Lubricate the O-ring with engine oil prior to installation of propeller.
(8) Hoist straps must be a minimum of 4 inches (100 mm) wide.
(9) Use a propeller sling and hoist, or additional personnel, to position the propeller close to the engine propeller flange and align engine flange dowel pins with the dowel pin holes on the propeller hub mounting flange. Rotate engine propeller mounting flange as required to align the dowel pin holes.

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CAUTION: Propeller must be installed straight onto the engine flange. Any cocking of the propeller with respect to the flange could result in damage to the engine/propeller flange mating surfaces.

(10) Mount the propeller on the engine propeller shaft.
(11) Make sure threads of nuts and studs are free of burrs, nicks, and similar damage, and clean of foreign material.
(12) McCauley Torque Wrench Adapter:

CAUTION: If an adaptor or extension (such as McCauley part number B-5588) is attached to torque wrench drive end and this adds to its length, then the actual applied torque will be greater than the dial reading. The following formula should be used to find what the dial should read in order to obtain the correct applied torque:

$$\text{Dial Reading} = \frac{\text{Torque Wrench Length x Desired Torque}}{\text{Torque Wrench Length + Extension Length}}$$

(13) Remove the D-5945 feedback collar retractor tool from the propeller.
(14) Make sure of proper rigging of engine controls. Refer to aircraft maintenance manual or STC maintenance manual supplement.
  (a) Do a propeller blade angle check. For details refer to Blade Angle Checking and Adjustment in Propeller Field Maintenance Practices.

CAUTION: Do not operate the propeller below the minimum propeller idle speed operating restriction. The minimum propeller idle speed operating restriction is the result of a specific vibratory resonant condition known as “reactionless mode”. Ground operation, at or near a reactionless mode vibratory resonance speed, can cause very high stresses in the propeller blades and hubs. These high stresses are more severe when operating in a tailing wind condition. If the propeller is operated within a restricted RPM range or below a minimum RPM restriction for an extended period of time, the propeller blades and hubs may become unairworthy due to fatigue. Hub or blade failure has the potential of causing a catastrophic event due to blade separation. The propeller RPM restriction is often placed below the minimum idle RPM; however, certain aircraft have a restriction that is above the propeller idle RPM setting. Either restriction is important. The propeller operating restrictions or limitations may be found in the Airplane Flight Manual (AFM) or Airplane Flight Manual Supplement (AFMS). The propeller installations may be controlled by the various airframe manufacturers Type Certificate (TC) or by Supplemental Type Certificate (STC).

E. Spinner Installation

CAUTION: Undershimming or overshimming of the spinner aft bulkhead could result in spinner wobble, vibration, and/or bulkhead and spinner cracking. Please follow shimming procedures carefully.

(1) Install propeller spinner fillets on the bulkhead with screws and washers if required.
(2) Insert shims into the spinner support and lightly press spinner support onto the cylinder on the front end of the propeller.

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(3) Mount the spinner onto the bulkhead and fillet assembly and check alignment of the mounting holes in the spinner and bulkhead.
   (a) Make sure that alignment marks on the spinner and propeller blade are matched.
   (b) Add or subtract shims to the spinner support until spinner mounting holes are aligned within one-half hole with the bulkhead mounting hole diameters while you push hard on the spinner shell.

(4) Use an awl or a small punch in an adjacent hole to move the spinner screw hole into alignment with the bulkhead hole and install the screw. Repeat the procedure on opposing holes until eight equally spaced screws and washers are installed.

(5) Secure the propeller spinner to the bulkhead and fillet assemblies with the remaining screws and washers.

7. Blade Angle Checking and Adjustment

A. General Information on Propeller Blade Angle Measurement

(1) Blade angles on McCauley propellers are normally measured with a propeller protractor at the 30-inch (reference) station.

NOTE: Certain models are measured at the 40.5 or 45-inch station.

(2) The reference station is indicated by a white or yellow painted line on the face of the propeller blade.

(3) The protractor can be placed directly onto the surface of the blade for measuring. No leveling pins are necessary.

NOTE: Feather and start-lock blade angles are set during assembly or overhaul. These angles are NOT adjustable in the field.

8. Flight Idle Blade Angle Checking and Adjustment Procedures (C600, C650 and C1100 Series Propellers)

A. Flight Idle Blade Angle Checking and Adjustment Procedure

(1) Open engine cowling.

(2) Remove the propeller spinner.

(3) Make sure that the engine controls are properly rigged.

(4) Place the base of the protractor on the top of the propeller cylinder and align it longitudinally to zero the propeller protractor.

(5) Position power levers at the flight idle position.

(6) When the propeller blades have stopped in the flight idle position, move the blade to be tested so the leading edge is up and 90 degrees from vertical.

NOTE: It is required to check the blade angle of only one blade.

9. Blade Maintenance

A. Removal of Blade Damage

(1) General
   (a) The propeller blade is a highly stressed part. The fact that propeller blades are subject to damage such as nicks, gouges, scratches, corrosion, pits, etc. demands frequent inspection and maintenance.
   (b) Repair of small nicks and scratches may be performed by qualified mechanics in the field in accordance with procedures specified in FAA Advisory Circular 43.13-1[X] and the following sections. After filing and polishing, the damaged area should be inspected, when possible, by dye penetrant method to verify that all damage has been removed and the blade is not cracked. The area should then be re-protected by localized application of chemical film per MIL-C-5541 (for example, Alodine) and repainted as necessary.
   (c) Large nicks or scratches or other damage involving such things as bent blades, balance, diameter reduction, etc. may be corrected only by an approved propeller repair facility.

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(2) Damage Specifications
  (a) The depth of damage must be measured using a depth gage.
  (b) Damage that is located on the leading or trailing edges must not exceed 0.125 inch (3.2 mm) in depth .
  (c) Damage that is located on a repairable area of the face or camber side of the blade must not exceed 0.063 inch (1.6 mm) in depth.
  (d) Damage depth greater than these limits is not field repairable. An approved propeller repair facility may be able to do a repair. Contact McCauley Product Support for disposition of any damage that is deeper than the specified limits.

(3) Repairable Damage
  (a) The primary type of blade damage that a mechanic need be concerned with is sharp stress riser type damage. This type of damage is caused by stones or other small objects striking the propeller blade as it rotates. Erosion caused by sand, water, etc. that does not create sharp stress riser type damage does not need to be repaired in the field.

CAUTION: The use of a rasp file is not recommended for field repairs. Rasp-type files will remove more metal than necessary, and may cause premature rejection of blades at overhaul.

  (b) It is very important that stress riser type damage be completely repaired. When filing damage is complete, a dye penetrant examination of affected area should be performed, when possible, to verify the stress riser has been completely removed.

(4) Leading Edge Repair Procedure
  (a) Remove metal at damaged area in such a way that the airfoil contour remains substantially the same. File strokes must run from blade shank to blade tip. Avoid abrupt changes in contour and blunt edges.
  (b) The length of the blended area shall be equal to 10 times the depth of the nick (refer to Figure 202). Use a suitable fine-cut file and course grain emery cloth, crocus cloth, or 600 grit sandpaper.

(5) Face and Camber Repair Procedures

CAUTION: Care must be taken to control hand-held grinder.

  (a) Remove metal at damaged area using hand-held rotary grinder with 120 or less grit bob, or by hand using course grain emery cloth. Use of file in this area is not recommended.
    1 Grind with light pressure in a circular motion until the damage is totally removed. The diameter of the repair shall be equal to 20 times the depth of the damage (Refer to Figure 202). Smoothly finish surface with fine grain emery cloth, crocus cloth, or 600 grit sandpaper.

(6) Repair Completion
  (a) Following removal of damage, the affected area should be prepared for touch-up paint by wiping with a methyl propyl ketone (MPK) dampened cloth. Apply polyurethane enamel paint to reworked area per Blade Painting.

B. Blade Painting
(1) General
  (a) Propeller blades are painted with polyurethane enamel paint. This paint provides optimum durability and abrasion resistance. If paint becomes eroded and is not repainted, damage to aluminum blade surface will be accelerated. This is particularly true at blade tips where operation in rain or reversing on sandy and/or wet runways can cause accelerated wear. It is, therefore, important to paint blades frequently as part of a regular maintenance schedule.

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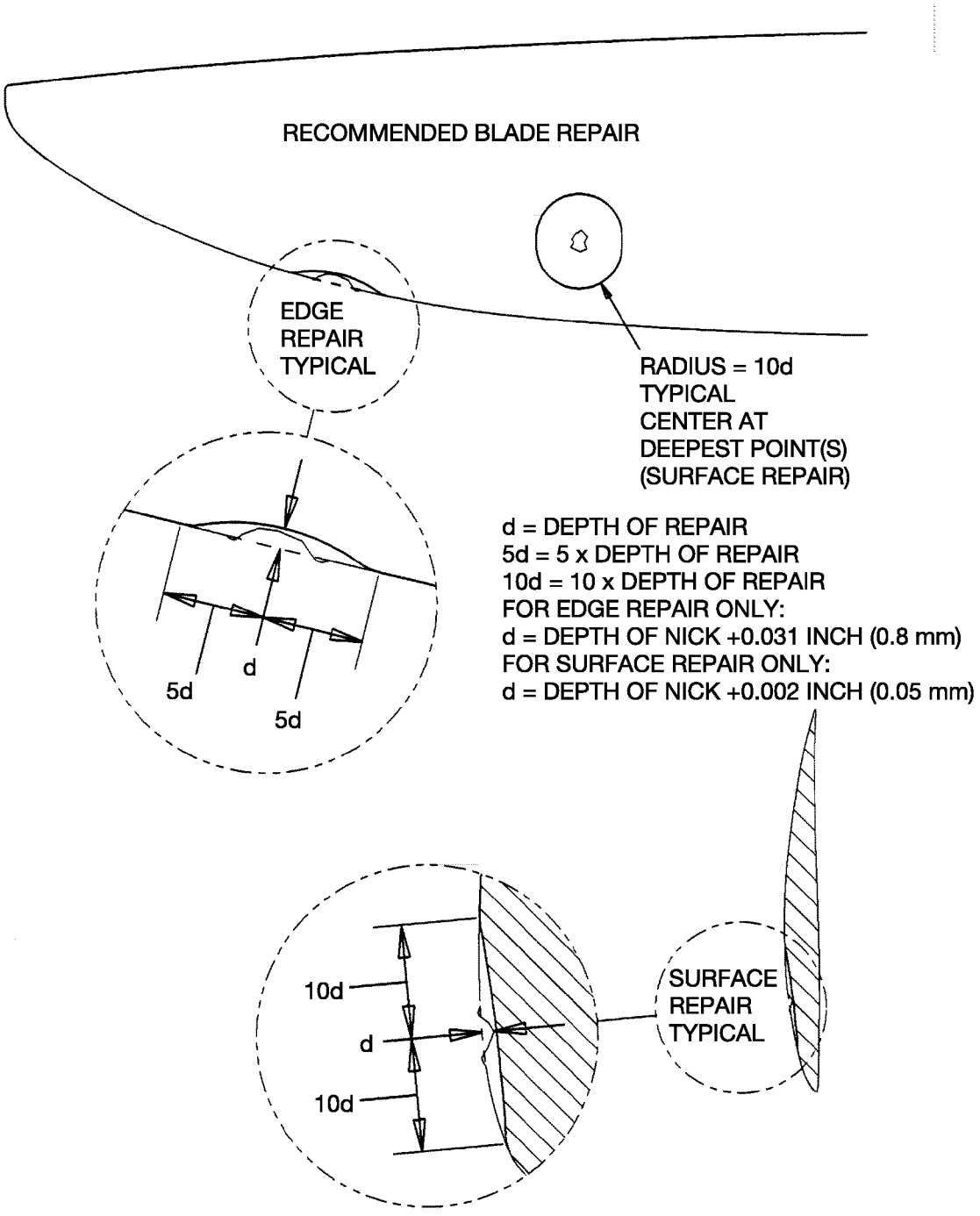
C53



Field Blade Rework Criteria
Figure 202 (Sheet 1)

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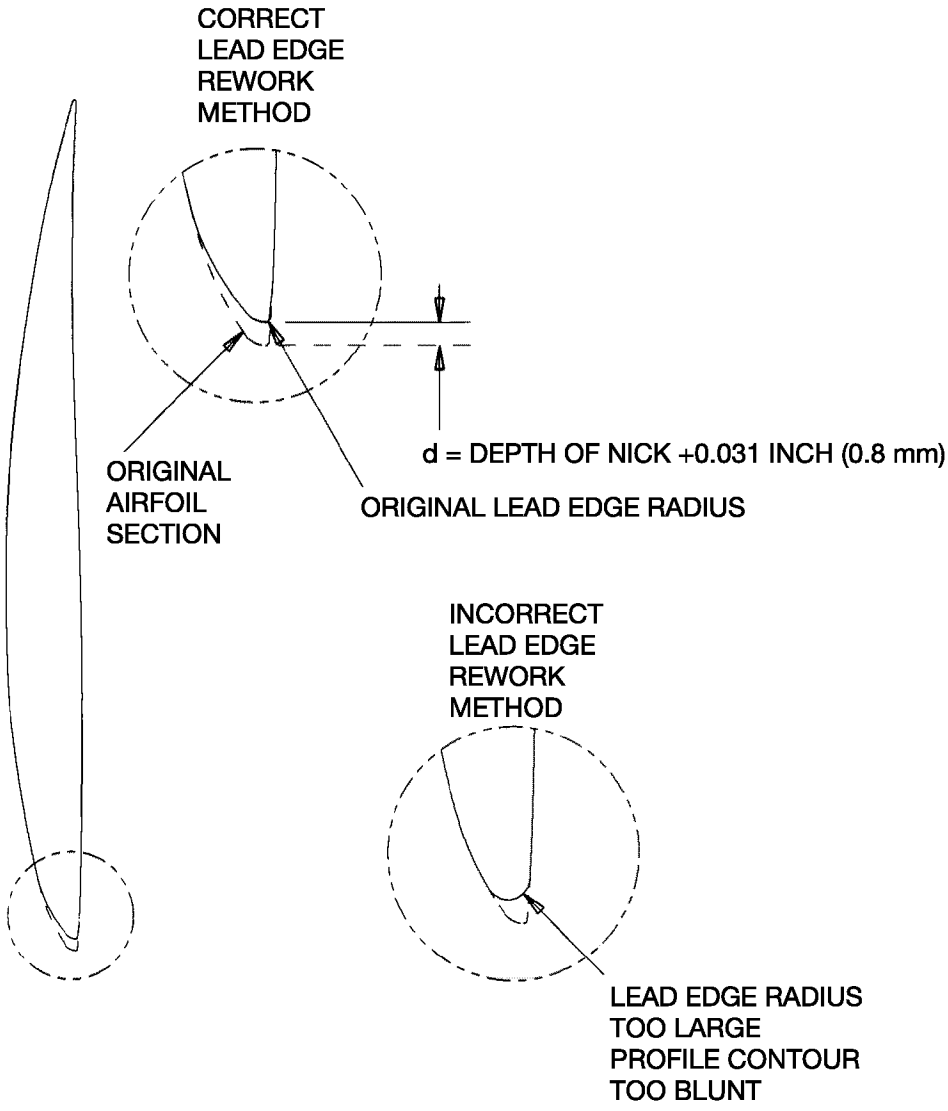

GENERAL RULES:
DO NOT REDUCE THE MAXIMUM THICKNESS OF SECTION.
KEEP THE ORIGINAL LEAD EDGE RADIUS.
BLEND TO THE PROFILE OF THE AIRFOIL SECTION.

Field Blade Rework Criteria
Figure 202 (Sheet 2)

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(2) Painting Materials and Procedures

NOTE: Follow painting procedures specified by paint manufacturer when painting blades.

(a) It is recommended that final dry film paint thickness be 6 to 9 mils for best abrasion resistance.

10. Propeller Internal Lubrication

A. Servicing of Propeller Internal Lubrication
(1) General
(a) Unless significant oil leakage is observed, periodic servicing of the oil in McCauley propellers is not normally necessary.

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PROPELLER PERIODIC INSPECTION PRACTICES

1. Limitations

A. Operational and service personnel should be familiar with the following limitations during any inspection.

B. Corrosion. Other than small areas of light surface corrosion with no evidence of pitting, the presence of corrosion may require propeller removal and reconditioning by an appropriately rated repair facility. Intergranular corrosion may be present when the corrosion protective coatings (paint, anodize, etc.) have been lost. Corrosion pitting should be removed as described in the overhaul manual and applicable ADs.

C. Unauthorized Straightening of Blades.
   (1) A bent propeller cannot be straightened without special processing in an appropriately rated repair facility because bending may harden the aluminum and lead to catastrophic blade failure.
   (2) All blades showing evidence of unapproved repairs require removal of the entire propeller and proper assessment by a repair facility.
   (3) Sighting along the leading edge of a propeller blade for any signs of bending can also provide evidence of unapproved blade straightening.
   (4) Any deformation of the flat portion such as bows or kinks may indicate previous unauthorized straightening of the blade.
   (5) Careful visual inspection of the leading edges and the flat-faced portion of the blade may sometimes detect unapproved repairs.
   (6) Blades should also be examined for any discoloration that would indicate unauthorized heating.
      (a) Aluminum blades that have been heated for any repair must be removed from service since only cold (room temperature) straightening by an approved repair facility is authorized.
   (7) Field service personnel should never straighten bent propellers to facilitate shipping when the propellers are being sent to a repair facility for inspection and repair. This procedure can conceal important information related to the severity of the damage.

D. Blade Shortening.
   (1) Propeller tip damage will sometimes lead field maintenance personnel to consider removing damaged material from the blade tips. However, propellers are certified to the aircraft engine and airframe resonant frequency by being manufactured with a particular diameter to minimize vibration. Shortening of the blades without reference to approved data could create an unairworthy condition. Refer to the airplane type certificate data sheet, aircraft specification sheet, or supplemental type certificate data sheet as applicable, for the allowable propeller diameter for each propeller installation.
   (2) With certain limitations, specific minor repairs may be accomplished.
      (a) The McCauley Blade Overhaul Manual shows the criteria for determining whether or not a minor repair of a blade tip represents blade shortening.
      (b) When conditions indicate, inspect the blade tips for evidence of shortening and, if necessary, measure the propeller diameter to determine if an unauthorized repair has altered it.

2. Daily or Preflight Inspection

A. Oil and Grease Leakage.
   (1) Look for red oil or engine lubricant leaks in unusual places, like the outside surfaces and seals.
   (2) Oil or grease leakage may be due to a seal failure or a crack in the hub or blade.
      (a) The source of the oil or grease leak should be determined before flight.
      (b) During maintenance, wipe the surfaces of the propeller after this inspection, not before, since oil leaking from a crack may assist in detecting it.
      (c) Red oil gives a positive warning of a crack in the hub or a damaged seal.

B. Blade inspection
   (1) Wash the blades with a mild soap and water solution to remove all residue.

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CAUTION: Do not use solvents to clean the blades.

(a) Do not power wash as water may be forced past the O-rings. Water inside the hub will cause corrosion and may cause propeller failure.
(b) Make sure the blade that you are cleaning is pointing down.
(c) Do not spray into the blade retention area because water may be forced into the hub.

(2) Surface Damage.
(a) Look for surface damage on both sides of the blades such as dents, nicks, scratches, and corrosion.
(b) Surface imperfections can also be felt by running your fingernail along the blade leading edge. Damage should be repaired before flight.
(c) Whenever a noticeable dent, nick, corrosion pit, or bump is observed, an appropriately rated mechanic should blend it out.
(d) The mechanic should remove all corrosion products and make sure that the section thickness has not been reduced below allowable limits.

(3) Erosion
(a) Examine the blade for evidence of erosion.
1 If blades appear to show erosion beyond limits, the propeller should be removed from service and evaluated by an appropriately rated propeller repair facility.
(b) Check the condition of the paint on blades and spinners that have protective paint.
1 Paint protects the surface of the blade from erosion. The blade should be repaired before the paint wears through and the blade structure begins to erode.
2 Do not apply excessive paint and do not paint propeller components unless it is in accordance with McCauley instructions since improper painting may affect propeller balance, operation, static electricity discharge, or have other unintended consequences.

(4) Straightness
(a) Sight down the edges to find any deformation.

(5) Looseness
(a) Feel the blades and move them to find unusual changes in looseness and unusual play.
1 Blade-to-blade differences indicate that an internal problem may exist.

C. Spinner and Bulkhead.
(1) Externally check the spinner and bulkhead for security, missing fasteners, damage, and cracks. Cracks typically originate from the attachment screws.
(a) Repair of cracks is not permitted.
(2) Check for looseness of the bulkhead. This could be an indication that the mounting bolts are loose.
(3) Wear depth on the inside of the spinner must not exceed 0.010 inch (0.25 mm).

NOTE: Wear inside the spinner can be caused by improper shimming of the spinner or by deice leads rubbing.

D. General Condition.

E. Control System.
(1) The control system (governor) should be checked to determine whether the system is operating properly and is not leaking.

F. Maintenance Records.
(1) Note any indications in the logbook for future reference to determine whether a condition is getting worse.

3. 100 Hour and Annual Inspection

A. At each 100 hours, Annual, or other approved inspection interval, examine the propeller in accordance with aircraft inspection manual. Inspection should include:
(1) Spinner Removal
(2) Inspection of all attaching hardware, including the hardware under the spinner, for security. Tighten if necessary.

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(3) Check entire propeller for corrosion, cracks, or other damage. Contact a McCauley Service Center for disposition if any unusual damage is found.
(4) Inspect entire propeller system for oil leakage. If leakage is confirmed, the propeller should be removed, thoroughly inspected, and resealed by an approved propeller repair facility or technician.
(5) Repaint propeller blades, as necessary, per Propeller Field Maintenance Practices, Blade Painting.
(6) Examine all placards for legibility and security of installation. Replace all placards that are illegible or not secure.

4. Necessary Actions Following Object Strike of Stationary Propeller, Blade Strike of Rotating Propeller, Bird Strike, or Sudden Engine Stoppage

A. Object Strike of Stationary Propeller
(1) "Object Strike" is defined as any impact of a non-rotating propeller by a substantial moving object, such as any personnel vehicle, aircraft tug, ground power unit, or similar.

NOTE: The definition is intended for use as an example only. Determination as to whether or not an object strike actually occurred is ultimately the responsibility of the aircraft operator.

(2) Inspect all blades for damage such as scrapes, gouges, etc. caused by the impact. Any damage beyond normal field repair limits (defined in other McCauley service information) is cause for propeller removal and repair as defined below.
(3) Check blade track and verify that all blades measure within 0.170 inch (4.3mm) of each other on turbine propellers. This is a one time check.
(4) Check blade twist. All blades in a propeller should have the same amount of "rotational play". If the difference in rotational play between two blades is beyond 1.0 degree, uneven internal wear or damage is the possible cause.
(a) For example, rotational movement of No. 1 blade measures 1.2 degrees and No. 2 blade measures 2.3 degrees. This would be considered excessive since the difference is more than 1.0 degree.) This check must be performed every 10 hours for the next 20 hours. If no change is seen after 20 hours, inspections may be discontinued.

B. Blade Strike of Rotating Propeller
(1) "Blade Strike", sometimes referred to as "Ground Strike", is defined as any impact or suspected impact of the rotating propeller upon such items as, but not limited to, the ground, tow bars, landing lights, carts, snow banks, hedges, etc. Please note that the above definition is intended for use as an example only. Determination as to whether or not a blade strike actually occurred is ultimately the responsibility of the aircraft operator.

CAUTION: Internal damage can occur without evidence of gross external damage.

(a) Any McCauley propeller experiencing a blade strike must be removed from the aircraft and completely overhauled by an FAA approved propeller repair facility in accordance with the applicable overhaul manual. A hub must be declared unairworthy and scrapped if any blade in the propeller assembly is bent beyond repair limits.
(2) Bird Strike
(a) "Bird Strike" can be defined as the impact of any bird into the rotating propeller causing damage.
(b) Inspect all blades for damage such as scrapes, gouges, etc. caused by the impact. Any damage beyond normal field repair limits is cause for propeller removal and repair. Refer to Blade Maintenance in Propeller Field Maintenance Practices.
(c) Check blade track and make sure that all blades measure within 0.170 inch of each other. This is a one-time check after a blade strike. (Refer to Blade Track Check in Propeller Periodic Inspection Practices.)

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(d) Check blade twist. All blades in a propeller should have the same amount of "rotational play". If the difference in rotational play between two blades is beyond 1.0 degree, uneven internal wear or damage is the possible cause.
1 (For example, rotational movement of No. 1 blade measures 1.2 degrees and No. 2 blade measures 2.3 degrees. This would be considered excessive since the difference is more than 1.0 degree.)
2 This check must be performed every 10 hours for the next 20 hours after a bird strike. If no change is seen after 20 hours, inspections may be discontinued.

(e) If blades do not meet the above criteria, the propeller must be removed from the aircraft and completely overhauled by an FAA approved propeller repairman per the applicable McCauley Service Manual.

(3) Sudden Engine Stoppage

(a) "Sudden Stoppage" is defined as any propeller experiencing a sudden decrease in RPM. This is commonly due to engine failure or seizure. Please note, determination as to whether or not sudden engine stoppage has occurred is ultimately the responsibility of the aircraft operator. McCauley recommends consulting engine manufacturer's data to determine criteria for sudden engine stoppage.

(b) Any McCauley propeller experiencing a sudden stoppage must be removed from the aircraft and completely overhauled by an FAA approved propeller repair facility in accordance with the applicable overhaul manual.

5. Blade Track Check

A. Check

(1) Turn propeller so that Number 1 blade is straight down.
(2) Position a smooth board beneath the blade tip.
(3) Block up the board firmly in place just clear of the blade tip.
(4) Place a pencil mark approximately one inch (25 mm) long on the board at the midpoint of the outer edge of Number 1 blade tip.
(5) Turn the propeller so next blade is straight down.
(6) Place a thin one-inch (25 mm) line on the board at the midpoint of the outer edge of the second blade tip.
(7) Carefully turn propeller, and repeat tracking measurement for each blade.
(8) Each time a line is added, measure the horizontal difference between the lines farthest apart.

(a) For propellers installed on piston engines, all blades must measure within 0.0625 inch (1.6mm) of each other.

(b) For C1101 through C1104 models propellers installed on turbine engines, all blades must measure within 0.1875 inch (4.7mm) of each other.

(c) For all propellers installed on turbine engines except C1101 through C1104 model propellers, all blades must measure within 0.170 inch (4.3mm) of each other.

(9) If blade track difference exceeds the allowable limits, recheck the blade face alignment. (Refer to Blade Overhaul Manual BOM100).

6. Lightning Strike Inspection Requirements

A. If doubt exists as to the occurrence of a lightning strike, the following criteria can be used to verify any suspicion:

(1) Check for burns or signs of arcing on blades and hub.
(2) Using a magnetism detector, check all exposed steel areas of propeller for magnetism.
(3) Look for any signs of localized melting or metal flow, particularly on blades.
(4) If preliminary inspection suggests an actual strike, a complete propeller overhaul is to be accomplished as per the applicable McCauley overhaul manual.

7. Dynamic Balance

NOTE: Some aircraft manufacturers do not approve dynamic balance of the propeller because of potential crack damage to spinner bulkhead from the installed weight.

A. Recommended test equipment.

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NAME	NUMBER	MANUFACTURER	USE
Balance Analyzer	Model 2020 Pro Balancer Analyzer	ACES Systems 10737 Lexington Drive Knoxville, TN 37932-3294 Web: www.Acessystems.com	

B. It is highly recommended that this procedure be performed following static balancing. All of the procedures and guidelines listed below should be used in conjunction with the dynamic balance equipment manufacturer's instructions.
   (1) Perform dynamic balance according to balance equipment manufacturer's instructions.
   (2) If the initial reading is over 0.8 ips, McCauley recommends the following should be checked/ corrected:
      (a) Shimming of the spinner shell.
      (b) Propeller installation (properly torqued and installed flat against the mounting flange).

      NOTE: If the shimming of the spinner shell and propeller installation are found to be acceptable but the initial reading is still over 0.8 ips, we recommend the propeller be taken to an FAA approved Certified Propeller Repair Facility or international equivalent for inspection.

   (3) If the initial reading is under 0.8 ips, continue the dynamic balance in accordance with the balance equipment manufacturer's instructions.

      CAUTION: At no time are static balance weights to be moved to adjust dynamic balance.

   (4) If the test indicates the addition of weights, temporarily place the indicated mass of balance washers in place of the spinner mounting screw at the location indicated by the testing equipment.
      (a) An AN970-3 washer weight = 0.144 ounces each (4.1 grams) plus screw (AN502-10-X)
   (5) Repeat the dynamic balance until the correct balance level (approximately 0.07 ips or lower) is achieved.

      NOTE: Most dynamic balance equipment manufacturers specify 0.15 - 0.2 ips as being an acceptable level. McCauley Propeller Systems agrees that 0.15 - 0.2 is an acceptable level, but our experience has shown that 0.07 ips or lower is noticeably smoother.

   (6) When dynamic balance is satisfactory:
      (a) Remove balance washers and screw from the spinner attach screw hole.
      (b) Permanently mount the balance washers and screws to the spinner bulkhead assembly at a point adjacent to the test location as shown on Figure 601.
   (7) Always place at least one balance weight under screw head for stress relief (see Figure1). Return original spinner screw to hole.

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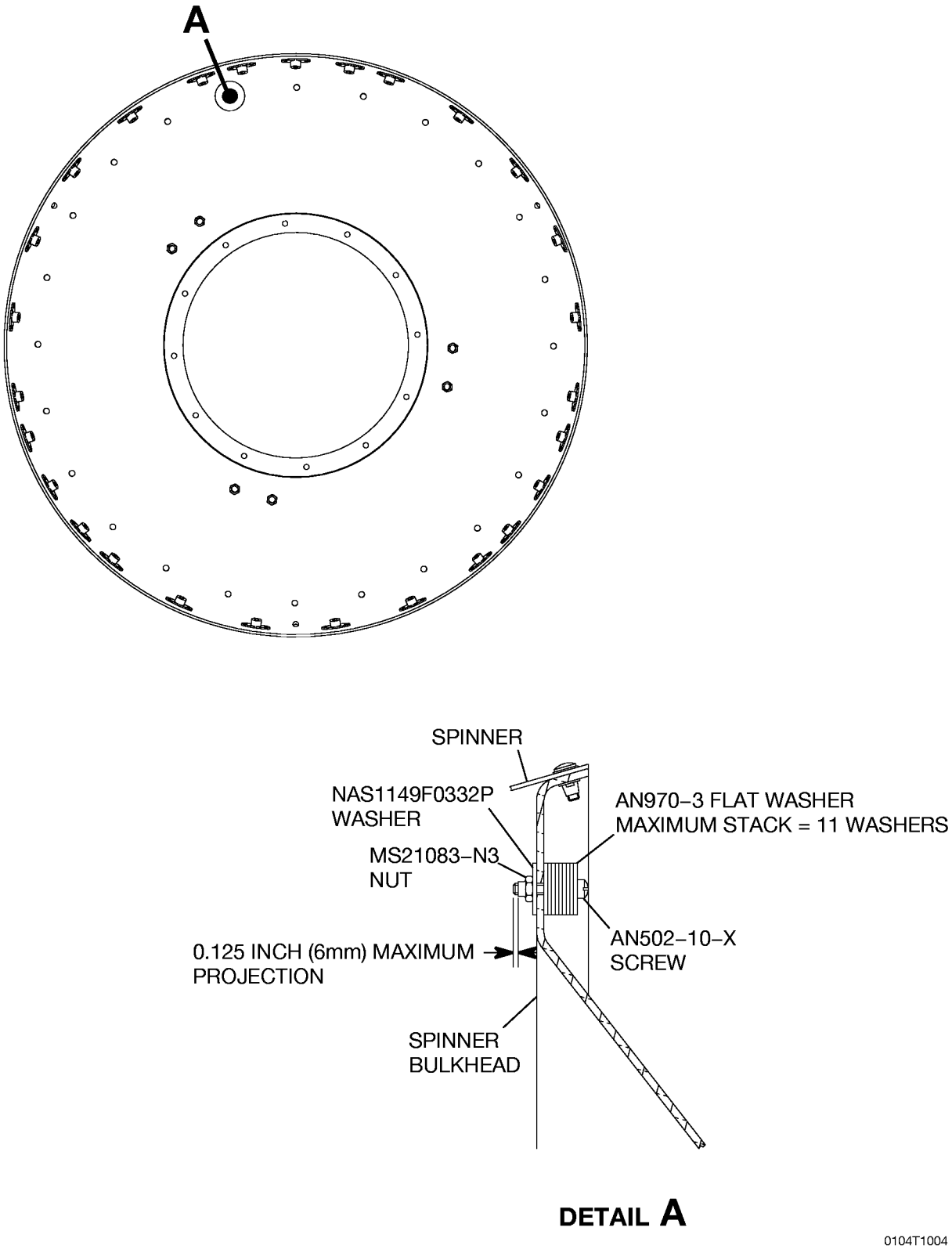
C670



Balance Weight Installation
Figure 601 (Sheet 1)

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WARNING: Use extreme care when you drill bulkheads near blades to avoid shank damage. Blade shank damage could potentially require propeller disassembly and blade replacement depending on the severity of the damage.

8. Vibration Troubleshooting

A. Troubleshooting vibration problems can be very challenging and time consuming. Most digital dynamic equipment can also be used to track down vibration problems. The digital dynamic balancing equipment can display the amplitude and frequency of the vibration which will help determine the vibration source. While vibration problems are occasionally caused by the propeller, they are usually caused by other things. Below is a list of other possible sources of vibration:
(1) Engine
(2) Worn, old, cracked or loose engine mounts
(3) Cracked or loose engine mount structure
(4) Cracked or broken spinner bulkheads
(5) Loose or improperly mounted engine cowlings
(6) Loose cowl flaps
(7) Loose landing gear doors
(8) Out of balance elevators
(9) Loose control yokes
(10) Exhaust stack touching engine cowling
(11) Component in engine compartment that is touching engine cowling

9. Overspeeding of Propellers

A. Following are inspection criteria for McCauley propellers involved in overspeed conditions.

	Percentage Overspeed	**Action to be Taken**
All Propellers on Reciprocating Engines	Up to, but not including 15%	General external visual inspection. No further action required.
	15% or Higher	Contact McCauley Product Support for disposition.
All Propellers on Turbine Engines except C1101, C1102, C1103, and C1104	Up to, but not including 10%	General external visual inspection. No further action required.
	10% or Higher	Contact McCauley Product Support for disposition.

10. Engine oil contamination

A. Any propeller exposed to engine oil contamination must be removed and sent to an approved propeller repair station for inspection. Refer to the service information of the engine manufacturer to determine if oil contamination has occurred or to determine the acceptable amount of metal particles allowed in engine oil.

11. Fire

A. Any propeller, propeller component, spinner component, or governor exposed to fire or excessive heat is considered unairworthy and must be scraped, if it shows any of the following conditions:
(1) Bubbled paint.
(2) Discolored paint.
(3) Discolored metal.
(4) Melted areas.

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INSTALLATION PARTS LIST

1. General

A. Use the Installation Parts List to identify and order correct replacement parts for propeller field maintenance.

B. These parts may be purchased through your local authorized McCauley propeller service center.

Table 1001. Installation Parts for Constant Speed Piston Engine Propellers

	C200 Series	C300 Series	C400 Series	C500 Series
Mount Nut	A-1639-2	A-1639-2	A-1639-2	A-1639-2
Mount Nut				A-1639-32
Spacer				A-4494
Mount O-ring	A-1633-3	A-1633-3	A-1633-3	A-1633-3
Mount O-ring Lycoming	A-1633-11		A-1633-11	A-1633-11
Mount O-ring				A-1633-49
Spinner Screw, bright nickel plated	A-1635-133		A-1635-133	A-1635-133
Spinner Screw, cadmium plated	A-1635-39		A-1635-39	A-1635-39
Spinner Washer, fiber	A-1638-5		A-1638-5	A-1638-5
Spinner Shim	B-3410-16		B-3410-16	B-3410-16
Spinner Shim	B-3410-32		B-3410-32	B-3410-32

NOTE 1: Mount nut A-1639-2 is 1/2-inch, A-1639-32 is 9/16-inch.

NOTE 2: Not all parts listed for a propeller series are required for every model propeller.

Table 1002. Installation Parts for Turbine Engine Propellers

	C600 Series	C650 Series	C700 Series	C750 Series	C1000 Series	C1100 Series
Mount Nut	A-1639-32	A-1639-32	A-1639-32	A-1639-32	A-1639-46	A-1639-32
Mount Nut					A-1639-32	
Spacer	A-4945	B-5096	B-5096	B-5096	B-5096	B-5096
Mount O-ring	A-1633-63	A-1633-72	A-1633-72	A-1633-72	A-1633-72	A-1633-72
Mount O-ring					A-1633-98	
Spinner Screw, bright nickel plated	A-1635-133	A-1635-133	A-1635-133	A-1635-133		A-1635-133
Spinner Screw, cadmium plated	A-1635-39	A-1635-39	A-1635-39	A-1635-39		
Spinner Screw, cadmium plated dyed black					A-1635-172	

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Table 1002. Installation Parts for Turbine Engine Propellers (continued)

	C600 Series	C650 Series	C700 Series	C750 Series	C1000 Series	C1100 Series
Spinner Washer, fiber	A-1638-5	A-1638-5	A-1638-5	A-1638-5	A-1638-44	A-1638-5
Spinner Shim	B-4940-1	B-4940-1	B-4940-1	B-4940-1	B-4940-1	B-4940-1
Spinner Shim	B-4940-2	B-4940-2	B-4940-2	B-4940-2	B-4940-2	B-4940-2

NOTE 1: C1100 Series does not include C1101 through C1104.

Table 1003. Installation Parts for Fixed Pitch Propellers

Basic Propeller Model Number	Spacer P/N	Dowel P/N	Fixed Pitch Bolt Kit						
			Bolt Kit P/N	Bolt Dia.	Drilled Head	No. Bolts	Bolt P/N	Washer P/N	Nut P/N
1A100/ACM	B-3400	A-2973-6	B-4622-10	3/8	Yes	6	A-2513-11	A-1638-13	NA
1P235/AFA	NA	NA	B-4622-25	1/2	Yes	6	A-2513-13	A-1638-2	NA
1A230/AFC	NA	A-4001	B-4622-4	1/2	No	6	A-2513-17	A-1638-2	A1639-2
C172/AGM	B-3515	A-2973-6	B-4622-15	3/8	Yes	6	A-2513-25	A-1638-13	NA
C190/ALM	C-3635	Note 2	B-4622-8	3/8	Yes	6	A-2513-30	A-1638-13	A-1639-6
1A200/AOM	NA	A-4001	B-4622-4	1/2	No	6	A-2513-17	A-1638-2	A1639-2
1A175/ATM	B-3898	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1A105/BCM	B-3927	A-2973-6	B-4622-16	3/8	No	6	A-2513-20	A-1638-14	NA
1B235/BFA	B-3637	A-2973-6	B-4622-27	1/2	Yes	6	A-2513-33	A-1638-10	NA
1A170/BMS	B-6627	A-2973-6	B-4622-41	1/2	Yes	6	A-2513-99	A-1638-2	NA
1A135/BRM	B-3718	A-2973-7	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1A135/BRM	B-3718	A-4001	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1C172/BTM	B-4381	A-2973-6	B-4622-37	7/16	Yes	6	A-2513-79	NA	NA
1A162/TCD	B-7925	A-7952	B-4622-49	3/8	No	6	A-2513-105	A-1638-13 and A-1638-14	A-1639-6
1A90/CF	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA
1A90/CF	NA	NA	B-4622-42	3/8	Yes	6	A-2513-9	A-1638-13	A-1639-6
1A170/CFA	B-3637	A-2973-6	B-4622-23	1/2	Yes	6	A-2513-33	A-1638-2	NA
1A90/CH	NA	Note 2	B-4622-42	3/8	No	6	A-2513-9	A-1638-13	A-1639-6
1C90/CLM	B-3515	A-2973-6	B-4622-33	3/8	Yes	6	A-2513-41	A-1638-13	NA
1B90/CM	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA
1B90/CM	NA	Note 2	B-4622-42	3/8	Yes	6	A-2513-9	A-1638-13	A-1639-6
1A135/CRM	B-3718	A-2973-7	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1A135/CRM	B-3718	A-4001	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1C160/CTM	B-3898	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1A101/DCM	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA

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Table 1003. Installation Parts for Fixed Pitch Propellers (continued)

Basic Propeller Model Number	Spacer P/N	Dowel P/N	Fixed Pitch Bolt Kit						
			Bolt Kit P/N	Bolt Dia.	Drilled Head	No. Bolts	Bolt P/N	Washer P/N	Nut P/N
1A170/DF	NA	NA	B-4622-30	3/8	Yes	8	A-2513-10	A-1638-13	NA
1A200/DFA	B-3434	A-2973-6	B-4622-28	1/2	Yes	6	A-2513-18	A-1638-10	NA
1B235/DFC	NA	A-4001	B-4622-5	1/2	No	6	A-2513-16	A-1638-2	A-1639-2
1C90/DLM	B-4160	A-2973-6	B-4622-13	3/8	Yes	6	A-2513-43	A-1638-13	NA
1A170/DM	NA	NA	B-4622-30	3/8	Yes	8	A-2513-10	A-1638-13	NA
1A170/DM	NA	NA	B-4622-36	3/8	Yes	8	A-2513-23	A-1638-14	NA
1A135/DRM	C-7639	A-2973-7	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1A135/DRM	C-7639	A-4001	B-4622-1	1/2	Yes	6	A-2513-18	A-1638-10	A-1639-2
1C160/DTM	B-4516	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1C160/DTM	C-4592	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1B90/ECM	B-3927	A-2973-6	B-4622-16	3/8	Yes	6	A-2513-20	A-1638-14	NA
1A170/EFA	B-4020	A-2973-6	B-4622-24	1/2	Yes	6	A-2513-39	A-1638-2	NA
1B235/EFC	C-7744	A-2973-7	B-4622-45	1/2	Yes	6	A-2513-103	A-1638-2	A-1639-2
1B235/EFC	C-7744	A-4001	B-4622-45	1/2	Yes	6	A-2513-103	A-1638-2	A-1639-2
1C160/EGM	NA	NA	B-4622-14	3/8	Yes	6	A-2513-19	A-1638-13	NA
1C172/EM	NA	A-4001	B-4622-3	1/2	No	6	A-2513-14	A-1638-10	A-1639-2
1A175/ETM	B-4516	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1A175/ETM	C-4592	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1A200/FA	NA	NA	B-4622-26	1/2	Yes	6	A-2513-15	A-1638-2	NA
1A175/FC	NA	A-4001	B-4622-4	1/2	No	6	A-2513-17	A-1638-2	A-1639-2
1C200/FC	NA	A-4001	B-4622-4	1/2	No	6	A-2513-17	A-1638-2	A-1639-2
1B90/FCM	B-4301	A-2973-6	B-4622-17	3/8	Yes	6	A-2513-53	A-1638-14	NA
1A170/FFA	B-4273	A-2973-6	B-4622-38	1/2	Yes	6	A-2513-71	NA	NA
1C160/FGM	B-4561	A-2973-6	B-4622-19	3/8	Yes	6	A-2513-41	A-1638-14	NA
1A200/FM	NA	NA	B-4622-31	7/16	Yes	8	A-2513-12	A-1638-11	NA
1A101/GCM	B-4304	A-2973-6	B-4622-11	3/8	Yes	6	A-2513-51	A-1638-13	NA
1A170/GM	NA	NA	B-4622-14	3/8	Yes	6	A-2513-19	A-1638-13	NA
1A175/GM	NA	NA	B-4622-14	3/8	Yes	6	A-2513-19	A-1638-13	NA
1A175/GMA	B-3515	A-2973-6	B-4622-15	3/8	Yes	6	A-2513-25	A-1638-13	NA
1A101/HCM	B-4351	A-2973-6	B-4622-12	3/8	Yes	6	A-2513-77	A-1638-14	NA
1A200/HFA	B-4585	A-2973-6	B-4622-29	1/2	Yes	6	A-2513-70	A-1638-10	NA
1B200/HM	C-1225	NA	B-4622-31	7/16	Yes	8	A-2513-12	A-1638-11	NA
1A135/JCM	B-3927	A-2973-6	B-4622-18	3/8	Yes	6	A-2513-43	A-1638-14	NA
1A170E/JFA	C-5464	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA
1A170E/JFA	C-7726	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA

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Table 1003. Installation Parts for Fixed Pitch Propellers (continued)

Basic Propeller Model Number	Spacer P/N	Dowel P/N	Fixed Pitch Bolt Kit						
			Bolt Kit P/N	Bolt Dia.	Drilled Head	No. Bolts	Bolt P/N	Washer P/N	Nut P/N
1A170E/JHA	C-5464	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA
1A170E/JHA	C-7726	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA
1A135/KCM	B-4446	A-2973-6	B-4622-19	3/8	Yes	6	A-2513-41	A-1638-14	NA
1A170/KFA	B-4273	A-2973-6	B-4622-38	1/2	Yes	6	A-2513-71	NA	NA
1A170/L			B-4622-30	3/8	Yes	8	A-2513-10	A-1638-13	NA
1B90/LCM	B-3400	A-2973-6	B-4622-10	3/8	Yes	6	A-2513-11	A-1638-13	NA
1C90/LF	C-1210	Note 2	B-4622-7	3/8	Yes	6	A-2513-7	A-1638-13	A-1639-6
1C235/LFA	C-7726	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA
1C235/LFA	C-5464	A-2973-6	B-4622-40	1/2	Yes	6	A-2513-92	A-1638-2	NA
1A170/LL	NA	NA	B-4622-30	3/8	Yes	8	A-2513-10	A-1638-13	NA
1C90/LM	C-1210	Note 2	B-4622-7	3/8	Yes	6	A-2513-7	A-1638-13	A-1639-6
1A100/MCM	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA
1C172/MDM	NA	NA	B-4622-30	3/8	Yes	8	A-2513-10	A-1638-13	NA
1C172/MFA	NA	NA	B-4622-25	1/2	Yes	6	A-2513-13	A-1638-2	NA
1B175/MFC	NA	A-4001	B-4622-5	1/2	No	6	A-2513-16	A-1638-2	A-1639-2
1C172/MGM	NA	NA	B-4622-14	3/8	Yes	6	A-2513-19	A-1638-13	NA
1C172/MTM	NA	A-2973-6	B-4622-20	7/16	Yes	6	A-2513-38	A-1638-11	NA
1A106/NCM	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA
1A102/OCM	C-4513	A-2973-6	B-4622-12	3/8	Yes	6	A-2513-77	A-1638-14	NA
1A102/OCM	C-4593	A-2973-6	B-4622-12	3/8	Yes	6	A-2513-77	A-1638-14	NA
1D200/OM	NA	A-4001	B-4622-5	1/2	No	6	A-2513-16	A-1638-2	A-1639-2
1A101/PCM	C-4513	A-2973-6	B-4622-12	3/8	Yes	6	A-2513-77	A-1638-14	NA
1A101/PCM	C-4593	A-2973-6	B-4622-12	3/8	Yes	6	A-2513-77	A-1638-14	NA
1P235/PFA	NA	A-2973-6	B-4622-28	1/2	Yes	6	A-2513-18	A-1638-10	NA
1A135/RM	NA	A-4001	B-4622-2	1/2	No	6	A-2513-58	A-1638-2	A-1639-2
1C172/SBTM	B-4425	A-2973-6	B-4622-37	7/16	Yes	6	A-2513-79		NA
1A105/SCM	NA	NA	B-4622-9	3/8	Yes	6	A-2513-8	A-1638-13	NA
1A170/SFA	NA	NA	B-4622-25	1/2	Yes	6	A-2513-13	A-1638-2	NA
1A170/SFC	NA	A-4001	B-4622-5	1/2	No	6	A-2513-16	A-1638-2	A-1639-2
1A175/SFC	NA	A-4001	B-4622-5	1/2	No	6	A-2513-16	A-1638-2	A-1639-2
1A105/SLM	C-1210	Note 2	B-4622-7	3/8	Yes	6	A-2513-7	A-1638-13	A-1639-6

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Table 1003. Installation Parts for Fixed Pitch Propellers (continued)

Basic Propeller Model Number	Spacer P/N	Dowel P/N	Fixed Pitch Bolt Kit						
			Bolt Kit P/N	Bolt Dia.	Drilled Head	No. Bolts	Bolt P/N	Washer P/N	Nut P/N
1A103/TCM	NA	NA	B-4622-43 (NOTE1)	3/8	Yes	6	A-2513-78	NA	NA
1C172/TM	B-3821	A-2973-6	B-4622-22	7/16	No	6	A-2513-35	A-1638-11	NA
1A200/WFA	B-3637	A-2973-6	B-4622-44	1/2	Yes	6	A-2513-102	A-1638-10	NA

NOTE 1: Bolt Kit B-4622-43 contains 6 ea. A-2513-78 bolts, 6 ea. B-73036 mylor gaskets, 1 ea. B-7287 Reinforcement Plate, and 1 ea. drawing B-7387..

NOTE 2: A-1170 bushings are included with the bolt kit.

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PROPELLER LOGBOOK

Dear Customer,

Congratulations on the purchase of your new McCauley propeller. Engineered with the customer in mind, it is designed to provide years of reliable and trouble-free service.

Scheduled maintenance or servicing of your McCauley propeller should be accomplished at your nearest McCauley Approved Service Station.

For the location of the McCauley Approved Service Station nearest you, refer to www.mccauley.textron.com 24 hours a day, or by calling 316-831-4021 between 8:00 AM and 4:30 PM Central Time.

NOTE: Having work performed at a facility other than a McCauley Approved Service Station may void your warranty.

FAA LOGBOOK REGULATIONS

1. Maintenance Records.

A. Refer to 14 CFR 91.417 for a complete copy of this regulation.

NOTE: The following statements contain excerpts from CFR 91.417 concerning propeller maintenance records.

B. Except for work performed in accordance with CFR 91.411 (Altimeter System and Altitude Reporting Equipment Tests and Inspections) and CFR 91.413 (ATC Transponder Tests and Inspections), each owner or operator shall keep the following records as specified in paragraph C.

(1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each propeller. The records must include:

(a) A description (or reference to data acceptable to the Administrator) of the work performed.
(b) The date of completion of the work performed.
(c) The signature, and certificate number of the person approving the propeller for return to service.

(2) Records must contain the following information:

(a) The total time in service of each propeller.
(b) The current status of life-limited parts of each propeller.
(c) The time since last propeller overhaul.
(d) The current inspection status of the propeller, including the time since the last inspection required by the inspection program under which the propeller is maintained.
(e) The current status of applicable airworthiness directives (AD) including, the method of compliance, the AD number, and revision date. If the AD involves recurring action, the time and date when the next action is required.
(f) Copies of the forms prescribed by CFR 43.9 (a) for each major alteration to the propellers.

C. The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph B.(1) shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.
(2) The records specified in paragraph B.(2) shall be retained and transferred with the propeller at the time the aircraft is sold.
(3) A list of defects furnished to a registered owner or operator under CFR 43.11 shall be retained until the defects are repaired and the propeller is approved for return to service.

D. The owner or operator shall make all maintenance records required to be kept by this section available for inspection by the Administrator or any authorized representative of the National Transportation Safety Board (NTSB).

2. Transfer of Maintenance Records.

A. Refer to 14 CFR 91.419 for a complete copy of the regulation concerning the transfer of propeller maintenance records.

NOTE: The following statements contain excerpts from CFR 91.419 concerning the transfer of propeller maintenance records.

B. Any owner or operator who sells a propeller (as installed equipment on an airplane or by itself), shall transfer to the purchaser, at the time of sale, the following records of that propeller:

(1) The records specified in CFR 91.417(a)(1).
(2) The records specified in CFR 91.417(a)(2).

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USE OF LOGBOOK

1. Use of Logbook

A. Proper maintenance of this logbook is the owner's responsibility. It is an important record designed for the owner's information and protection.

B. If the propeller is sold or installed on another aircraft, the logbook should be transferred with the propeller.

C. It is recommended that maintenance release tags and work orders be attached inside the logbook. If a copy of the work order is not available, the repair station and work order numbers should be referenced in the logbook entry.

D. All Airworthiness Directives, Service Bulletins, and Service Letters have been complied with at the time of production.

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PROPELLER INSTALLATION	
PAGE NUMBER _____	
Owner Name	
Address	
Propeller Model	
Blade Model	
Hub Serial Number	
Blade No. 1 Serial Number	
Blade No. 2 Serial Number	
Blade No. 3 Serial Number	
Blade No. 4 Serial Number	
Blade No. 5 Serial Number	

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INSTALLATION HISTORY

PAGE NUMBER _____

Date	Aircraft Model, Serial Number, and Registration Number	Engine Serial Number & Position

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PROPELLER ASSEMBLY LOG

PAGE NUMBER _____

Date	Total Time	Time Since Overhaul	Aircraft Model & Registration Number	Maintenance Service History	Signature & Certificate Number

PROPELLER BLADE LOG

PAGE NUMBER _____

Blade Model _____
Blade Serial No. _____

Date	Total Time	Installed In Hub Model/Serial Number	Aircraft Type & Serial Number	Maintenance & Service History	Signature & Certificate Number

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FAA AIRWORTHINESS DIRECTIVE AND SERVICE BULLETIN/SERVICE LETTER COMPLIANCE RECORD

PAGE NUMBER _____

Date	Total Propeller Time	Time Since Overhaul	Airworthiness Directive/Service Bulletin/Service Letter Number	Signature & Certificate Number